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Mobile 3D Extremity Scanner

The Planmed Verity, by Planmed Finland, is a mobile 3D imaging device designed for extremity imaging at the point of care. Its purpose is to capture often-missed fractures in the extremities. It allows preoperative scanning at a lower radiation dose than full-body CTs.

The scanner utilises Cone Beam Computed Tomography technology to provide high resolution volumetric images of the extremities. Compact, stand-alone and mobile, the scanner can fit into almost any existing x-ray room, alongside other imaging equipment. The adjustable, soft-surfaced gantry and dedicated patient positioning trays provide versatile patient positioning and optimised patient comfort.

Low radiation

Volumetric imaging with multi-planar reconstruction and volume rendering give optimal visualisation of fractures and deformations. The scanner has a superior isotropic resolution of up to 0.2mm with an optional 0.1mm high resolution mode. The radiation dose is up to ten times lower than extremity imaging protocols with conventional Multi Detector Computed Tomography. During the scan, which takes less than 20 seconds, images are acquired using a short x-ray pulse instead of continuous radiation.

The scanner adapts to the patient. It has an easily adjustable gantry and motorised positioning trays with a teardrop-shaped bore that helps find a comfortable position during various examination procedures. It’s easy to access, ideal for wheelchair patients and bedside imaging. The compact design prevents claustrophobia making the examination more comfortable, especially for the elderly and paediatric patients.

Special gantry movements allow weight-bearing 3D scans of a standing patient. It can image seated, supine and standing patients. The adjustable user interface and efficient all-in-one workflow are also designed to maximise the operator’s presence for the patient.
Tiny Devices Provide Secure Laparoscopic Organ Retraction

The EndoGrab and EndoLift port-free laparoscopic retractors, by Israeli company Virtual Ports, use proprietary micro-anchoring technology to provide secure laparoscopic organ retraction using exceptionally small-profile devices.

The retractor is specifically designed to retract larger soft tissue structures, such as the uterus and liver, from the body cavity through an existing port. The retractor and organ are anchored directly to the endocavity wall, outside the surgeon’s critical view, resulting in greater tissue access without cluttering the laparoscopic workspace. Surgeons can use the retractors to move obstructing anatomy in either an anterior or superior direction, which optimises visualisation of the target tissue.

The retractor deploys quickly and safely through an existing 5mm or larger port by means of a reusable applier hand instrument, and assumes its functional shape once inside the body. Its telescopic stainless steel bar and two articulated clips (positioned on either end of the bar) give flexibility in choosing the angle and direction of retraction.

The bar is positioned underneath the soft tissue and the applier instrument is used to grasp one of the clips and anchor it to the intra-abdominal wall. The lift necessary to move the soft tissue structure out of the operative field is created by fastening the second clip. Once the organ is securely fastened to the peritoneal wall, the applier instrument is removed and the port is available for use by other laparoscopic tools.

This technology minimises complications and reduces the costs associated with conventional organ retraction. Fewer incisions mean less post-operative discomfort, risk of infection, recovery time, and procedure costs. Operating room personnel who hold conventional retraction devices are now free to perform other tasks.

Wristband Monitors and Alerts for Improved Hand Hygiene

The IntelligentM wristband has been developed as a hand-hygiene compliance solution. It employs radio frequency identification (RFID) readers built into the wristband to identify passive tags on soap dispensers, IV solution packaging, surgical drains, and ID badges. It alerts users if they fail to wash their hands or need to do so more thoroughly. The system also collects data for business analytics and can share that information with hospital management and staff. Data is uploaded to the server when the wristband is recharged at the end of a shift. Analytic data is provided via a web-based dashboard. Weekly hand-hygiene ‘report-cards’ are sent to employees.

The wristband comes with a built-in RFID reader, a motion sensor, and a rechargeable battery. The urethane exterior is blended with silver ion material that makes its exterior surface antimicrobial. The wristband’s design is small enough so as not to be cumbersome to users who may be wearing and removing rubber gloves.

The reader can issue real-time alerts to a wearer and also store the details of each RFID read event. Typically, a RFID tag is attached to an employee ID badge. When picking up a wristband from the charger at the beginning of a shift, the employee would hold the wristband next to the tag, which would store that ID thereby indicating who was using it. If the badge ID was not linked to the wristband, the reader would vibrate three times as a reminder to do so.

Hand-hygiene is the single largest contributor to the almost 2m hospital-acquired infections that kill 100,000 people in the US each year.
For years gastric bypass surgery has been the gold standard for dramatic weight loss in obese patients. ReShape Medical, an obesity startup (San Clemente, California) is providing a non-surgical alternative to weight loss with its intragastric balloons.

The ReShape Duo is inserted endoscopically through the mouth into the patient’s stomach. It works by filling up space inside the stomach so that the patient feels satisfied when eating small meals. The temporary device remains in the stomach for six months. During this time the company works with each patient to help them develop the principles of portion control, diet and exercise. After the six month period when the device is removed, the company continues to work with patients so that a healthy lifestyle and eating habits are retained.

**Outpatient insertion and removal**

The device is introduced during a 15-30 minute outpatient procedure using conscious sedation. An endoscope is inserted through the mouth into the stomach where the un-inflated twin balloons are advanced over a guidewire and are precisely placed in the stomach. Each balloon is inflated with saline and independently sealed.

Removal occurs during a second 15-30 minute outpatient endoscopic procedure. Each balloon is completely drained in a controlled manner. A snare securely captures the deflated balloons and the device is removed through the mouth.

Filled with evenly distributed 900ml of saline, the device occupies 60% more space than a single balloon without over-distending the stomach. It is designed to conform to the natural curvature of the stomach which improves patient comfort during the weight loss programme. The dual balloon design also helps mitigate risk of migration and/or obstruction. The device has been successfully used in Europe since 2007 with patients losing an average of one-third of their excess weight in six months.

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Switching to Online Patient Records Saves Doctors an Hour a Day

Moving from a paper-based practice to an online electronic medical record system yields benefits that far outweigh the relative simplicity of switching. Med-e-Mass recently launched HEALTHone Connect to meet the need for an integrated clinical and financial management system so that doctors can maintain complete control over every aspect of their businesses.

Doctors can now create, store, and share patient records on an online mobile platform that is secure and convenient. International research has shown that the effective use of an electronic patient record system can save an hour a day, which can be better spent with patients.

**Mobile convenience**

Using the new Apple iPad app, work can be done offline during rounds or between surgical procedures when connectivity is unavailable. When connectivity is re-established, records synchronise securely and easily. An Android app is currently being developed.

HEALTHone has negotiated integration with SA’s top three path labs which ensures a seamless flow of lab results into the patient’s record.

The software has many enhanced patient care and management features. These include:

- Analysis of clinical data
- Access to treatment protocols
- Generation of drug prescriptions
- Creation of documents, reports, referrals, and certificates
- Quick search and retrieval of records
- Integration of text and medical images
- Integration of laboratory and shortly radiology data
- Capturing of all patient vital signs and body metrics with analysis
- Maintaining the patient’s medical history
- Capacity to include custom practice-centric data forms.

The application is robust enough to meet US legislated security standards. These standards focus on: Confidentiality, where electronic patient health information (ePHI) is not made available or disclosed to unauthorised persons or processes; integrity of ePHI, ensuring that data has not been altered or destroyed in an unauthorised manner; and availability, so that ePHI is accessible and useable upon demand by an authorised person.

The application is cross browser compatible and any internet connected device can access the application. It is geared to introduce efficiency into the management of clinical information which ensures good clinical practice and improved patient care. The application was developed in Brussels and is currently in use in Belgium, Ireland, France, Switzerland, South Africa and the US.

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More on...

**Keywords:** Reshape Duo Procedure

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Available from:

Med-e-Mass

Tel: 0860 98 00 98

www.medemass.com
No Hysterectomy Necessary When Treating Uterine Fibroids

Uterine fibroids are benign tumours that extract a significant economic drain on the healthcare system, costing anywhere from $6b to $34b a year in the US. These costs come largely from disability, but include medical treatment as well as obstetric complications. Fibroids result in 30,000 myomectomies and 200,000 hysterectomies among US women each year.

Uterine fibroid embolisation is an alternative treatment for women requiring relief for symptoms attributed to uterine fibroids, including heavy menstrual bleeding, pelvic pain or pressure, and/or urinary dysfunction. This procedure preserves the uterus.

Merit Medical’s Embosphere Microspheres are calibrated, spherical, hydrophilic spheres. The proprietary design allows more complete and targeted occlusion of the blood vessels feeding a hypervascular tumour or arteriovenous malformation. The hydrophilic surface and spherical shape prevent aggregation within microcatheter lumens and in the vasculature. This promotes ease and accuracy of delivery.

Fights venous stasis
DVT is a chronic silent disease, and primary prevention is the key to decreasing morbidity and mortality. The exact physiological mechanism of intermittent pneumatic compression (IPC) is only partly understood. Besides enhancing venous blood flow in the legs, IPC devices cause an increase in endogenous fibrinolysis owing to stimulation of vascular endothelial walls and reductions in the calibre of veins. IPC overcomes venous stasis by fibrinolytic activity in normal and post-thrombotic subjects.

The incidence of DVT and pulmonary embolism (PE) closely correlates with many surgical procedures performed today. Dr. Joseph Camprini cites that the incidence of DVTs and PEs without prophylaxis is approximately 10%-40% among medical and general surgery patients, and up to 60% following major orthopaedic surgery.

Contraindications include fresh or pre-existing DVT, pulmonary embolism, leg gangrene, recent skin graft, acute thrombophlebitis, and medical situations where increased venous and lymphatic returns are undesirable.

Mobile Device Combats DVT and Pulmonary Embolism

The Vasculaire Intermittent Compression System, by Venous Health Systems, California, is a lightweight mobile device that attaches to a sleeve wrapped around the patient’s foot or calf. The sleeve provides compression to the foot and calf areas in a wave-like motion, beginning at the distal point. The compression is designed to increase blood flow in arteries and veins. The weight of each controller and sleeve is less than 240g. The rechargeable battery lasts around eight hours and takes two hours to recharge.

The compression system is indicated for use in preventing deep vein thrombosis (DVT), diminishing post-operative pain and swelling, treatment of chronic venous insufficiency, enhancing blood-circulation, reducing wound healing time, stasis dermatitis, venous stasis ulcers, arterial and diabetic ulcers, and reducing oedema.

More on...

Keywords: embosphere microsphere

More on...

Keywords: vasculaire compression

Get the free mobile app at http://gettag.mobi
Tonic Herb Improves Fitness and Memory Whilst Boosting Immunity

Malaise and fatigue are common complaints especially as the population ages. It is often untreated due to perceptions that it is not a medical condition to be concerned about. Ginseng (panax ginseng G115) is the best known tonic in traditional Chinese medicine spanning over 2000 years of use. Flordis Ginsana is the most scientifically researched ginseng product worldwide said a company spokesperson. The 20-step standardisation process guarantees product quality and ensures replicable scientific research and clinical outcomes. Plants aged between five and seven years produce the best levels of ginsenosides. More than 200 compounds have been identified in the main root. These are believed to have synergistic effects.

Mechanism of action
• Multi-tasking, over-worked adults: reduces physical and mental strain; enhances physical capacities
• Immunodeficient patients: reduces the incidence and consequence of common infections
• Sportspeople: shortens recovery time and improves oxygen uptake

Clinical studies
Clinical studies on normal subjects, patients and well trained athletes showed an increased oxygen uptake capability, lowered fatigue and shortened recovery time using daily doses for four to twelve weeks. Trials on cognitive performance in healthy people found significant improvement in the speed of performing memory tasks and in the accuracy of attention tasks. A significant reduction in perceived fatigue was found during sustained mental activity.

Studies on the immunostimulant effects show:
• Stimulated immune responses by positively influencing a higher number of immune cell subsets
• Improved immune response of alveolar macrophages in chronic bronchitis and potentiated vaccination against common cold and/or flu
• Reduced bacterial counts in patients suffering from chronic bronchitis when treated with an antibiotic.

All-Suture Anchor for Shoulder Repair

It’s small, it’s strong and it’s all suture! The JuggerKnot Soft Anchor is the next generation in suture anchor technology. The 1.4mm deployable anchor is the first completely suture-based system.

The soft anchor is a soft tissue to bone fixation device that consists of a coreless sleeve and suture construct. The uniqueness is that the device does not require a rigid body for bone engagement. The implant, made from #5 polyester suture, is loaded with a MaxBraid suture. The volume of bone removed with a 3mm drill is four times what this device demands. The smaller anchor diameter allows multiple anchors to be placed in various anatomical locations.

A smaller cannula is less invasive to surrounding tissue. The MaxBraid suture has been shown to have superior knot security over competitive sutures. There is a reduced likelihood of intersecting anchors when placing multiple anchors. The importance of bone conservation is inherent as it is always a goal to minimise collateral damage to healthy anatomy.

The anchor has been designed for multiple indications, including hand and wrist procedures. This implant’s polyester sleeve provides solid cortical fixation, eliminating the possibility of rigid material loose bodies in the joint.

The all suture construction is porous, allowing blood to flow through it. Studies have shown that despite the unusual construction, the soft anchor provides adequate fixation strength (9kg for the 3mm version and 12kg for the 2mm) while minimising bone disruption, osteolysis and implant migration concerns.
Sony Extends Medical Line-up with New Radiology Diagnostic Monitors

To demonstrate Sony’s leadership in medical innovation, Sony Professional has introduced its first ever line-up of high-quality diagnostic displays, the LMD-DM Series. The range gives the discerning buyer five distinct options; three diagnostic displays being monochrome and the other two colour.

With their high-luminance and high-contrast capabilities, these superior monitors offer exceptional clarity allowing users to display and view medical images such as those obtained from MRI, X-ray and digital mammography.

With these new monitors, Sony is further expanding its footprint in radiology adding to its already long list of technology offerings including recording devices, printers, LCD displays and other essential equipment for medical applications.

Triple quality
The LMD-DM50 and LMD-DM30 will feature the company’s Independent Sub-pixel Drive (ISD) technology that is capable of producing three times the resolution of monochrome LCDs. This technology triples the resolution of a screen by splitting each pixel into three independent ‘sub-pixels’.

The technology’s use of three independent sub-pixels in a single pixel enables a 5MP display to achieve a resolution up to 15MP. Correspondingly, the feature used with the 3MP display allows for a maximum of 9MP.

The unique ISD technology, which brings an even higher resolution output to the radiology market, ensures users are equipped for the future as imaging technology modalities continue to advance their systems with greater outputs.

“Now radiology users can experience and benefit from the breakthrough innovation in medical display technology that Sony has been successfully delivering to other areas of healthcare, including surgery,” said Will Klopper, Sales and Marketing Manager for Sony Professional Products. “This development gives the market a full range of high quality radiology displays from Sony that help enhance visualisation.”

Ideal for full field digital mammography
Available in both the 5MP and 3MP grayscale models, ISD creates reliable image quality for viewing high resolution diagnostic studies including CR and DR images, CT, MR and particularly full field digital mammography (FFDM) where detailed viewing of micro-calculifications is possible.

The LMD-DM50, LMD-DM30 and LMD-DM20 can also be used in digital mammography PACS.

Colour versions
The two remaining diagnostic displays in the range, the LMD-DM30C and LMD-DM20C, can be used in displaying and viewing medical images such as MRI and CT. These displays are not designed for digital mammography.

Range details
The five new radiology displays now available for purchase:
- 5MP Diagnostic Display for Full-Field Digital Mammography
- 3MP Color Display
- 3MP Grayscale Display
- 2MP Color Display
- 2MP Grayscale Display

Accurate colour, DICOM approved
All Sony displays are designed specifically for radiology review and are loaded with a high-luminance, high-contrast LCD panel that can simultaneously display 1024 shades of gray and deliver accurate colour reproduction. They deliver colour or grayscale results, can be used in portrait and landscape modes, and are fully DICOM GSDF Part 14 conformant.
Redefining Surgical Procedure

Sony HD technology gives you the power to view details with exceptional clarity and pin point precision.

LMD-2451MD
- High definition medical grade monitor
- Optimised picture preset for main endoscopy brands
- ChromaTR colour processing
- 24" LCD panel with 1920 x 1200 pixel resolution
- 16 bit digital video processor

LMD-DM20
- High quality radiology diagnostic monitor
- DICOM approved
- Both colour and black and white screen models available

HVO-1000MD
- High definition medical grade recorder
- Records on internal 320 GB HDD and external USB HDD or flash memory
- Records on Sony disk
- HD-SDI, DVI, RGB and S-Video inputs
- Video streaming over network

PMW-10MD
- Medical grade high definition camera for microsurgery and microscopy
- HD recording and still image capturing

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A good place to start is always the weather; non-contentious and applies to all. The Winter Solstice (in Johannesburg) is at 07:03:25 on Friday the 21st June and the day will last 10 hours 29 min and 49 seconds. You will be thrilled to know that Saturday, the 22nd will be a full second longer and thereafter the roller coaster speeds up and suddenly it’s braais, beers and Badplaas!

Before then, however, we have to survive another ‘winter of discontent’ of strikes, protests, civil disobedience, inflation and a falling Rand. Amongst all of the current mayhem has been the re-emergence of xenophobia. This is something of a misnomer as the term doesn’t usually apply to fear of strangers but should rather be xenomisia (hatred of strangers). Whatever, the intensity of the response always exceeds that of our common and garden prejudice.

I am beginning to think that the Home Affairs Department and HPCSA might suffer from a touch of this dreaded lurgy. Perhaps it is just ordinary bureaucracy but it is nigh impossible for foreign trained doctors (excluding Cuban-trained) to jump through all the hoops and get registration. While I understand the dangers of poaching from our neighbours, the public sector is often desperate for health workers to fill critical niches required for patient care.

It is not only South Africans that create these obstacles. My youngest is a government Medical Officer in a rural community near Melbourne. The Aussie authorities have been giving her the run around for more than a year now. Perhaps it is more understandable in a country with too many medics.

This won’t hurt
This month’s issue has another local contribution from a home-grown fundi. Professor James Roelofse from the Western Cape is an authority on conscious sedation (CS). This first article defines the process and the basic techniques for this important adjunct to anaesthesia. The concept is not a new one and the original research arose in Germany, where Dämmerschlaf (twilight sleep) was introduced in the early 1900s to abrogate the Primal Curse; “I will greatly multiply the sorrow of your conception; in sorrow thou shalt bring forth children.” From these humble origins, the combination of new and sophisticated psychotropic and analgesic agents has made CS an ‘art-form’.

Back pain cautions
The general articles reviewed for CPD this month include a variety of reviews on the management of common problems that challenge the practicing doctor. Hypogonadism may represent a tragedy in a young man but as the population becomes more aged there is still a plea for a magic elixir. Learn when, what and how. The treatment of rheumatoid arthritis was, until recently a balance between NSAIDs and more toxic chemotherapeutics and steroids. There is now a host of biological options to add to the armamentarium.

Another very common problem is non-specific low back pain. Unfortunately, the vast majority of sufferers are never cured but have either chronic persistent pain or, more commonly, recurrent episodes. This article helps to differentiate between serious underlying pathologies and more benign causation. There is also a review on distinguishing seizures from other paroxysmal events. In children, at least 25% of patients referred for the treatment of epilepsy have some other cause for a paroxysmal event. These are caused by anything from syncopal attacks to masturbation! In the accompanying article the situation in adults with ‘seizures’ is reviewed.

The release of Prof Karabus and his repatriation to SA is a relief to all of us. His detention in the UAE was disturbing. The lesson learnt is that we should all think twice about becoming soldiers of fortune in a country where the foreign work force is treated with such disdain. The only good to come of this was the unification of the medics in his support.

Keep warm.
Circumcision: Is it Still Ethical and Legal?

The prepuce should be harvested and used by Eskom as an amazing source of alternate energy; the amount of heat produced per gram by simply discussing this sliver of tissue is phenomenal! The recent rekindled interest in circumcision as an adjuvant to the prevention of HIV infection warrants another look at this surgical intervention.

History of circumcision

The origins of circumcision are truly lost in the sands of time. Certainly there is beautifully preserved evidence of circumcision from the pyramids. Sixth Dynasty (2345–2181BC) tomb artwork in Egypt is thought to be the oldest documentary evidence of circumcision, the most ancient depiction being a bas-relief from the necropolis at Saqqara (ca. 2400BC).

The very essence of the debate around the prepuce turns on whether or not this ‘organ’ is a useful termination to the male genitals or simply an unnecessary skin-tag under which undesirable gleet and potential pathogens can squat.

In 1861, one PC Remondino wrote a scholarly history of circumcision entitled “History of Circumcision from the Earliest Times to the Present”. It is quite clear that his opinion of the foreskin was less than complimentary. In Chapter XIX he aired his anatomical prowess and waxed-poetic that, “If the prepuce only was endowed with an olfactory sense,—as, for instance, if a nervous filament from the first pair of nerves had been sent down alongside of the pneumogastric and then, by following the track of the mammary and epigastric arteries, had at last reached the prepuce, where the olfactory sense could have been turned on at will, like an incandescent lamp,—it might have been a very useful organ, as in that sense it could have scented danger from afar, if not from near, and enabled man to avoid any of the many dangers into which he unconsciously drops. But, seeing that the prepuce, to say nothing of being neither nose, eye, nor ear to warn one away from danger, or a leg to run away on after once in it, having not even the precautionary sensitiveness of a cat’s moustachios, it cannot, in any way that we can see, be compared to any other useful part of the body.”

Reasons for circumcision

These can be usefully divided into three groups: medical, religious/cultural or routine.

Medical indications

Medical indications cited have included:
- The treatment of local diseases such as phimosis, paraphimosis and balanitis
- The prevention of STIs such as syphilis, gonorrhoea, herpes and now HIV
- The prevention of urinary tract infection in boys
- The prevention of cancer of the penis
- The prevention of cancer of the cervix in partners

Many of these medical ‘indications’ have been refuted or qualified by substantial restrictions. I will concentrate on HIV later.

Religious/cultural

Two of the major world religions, Judaism and Islam advocate circumcision early in life. Jewish boys are circumcised on the eighth day of life by a trained religious Jew, a mohel, whereas the Moslem boy is usually circumcised before the age of seven years and this may be performed by a medical professional.

Cultural circumcision is common in SA amongst a number of tribes. About 90% of IsiXhosa speaking males are circumcised whereas only about 12% of TshiVenda speakers have had the procedure. Cultural circumcision is performed as a pre-pubertal ‘rite of passage’ into manhood. The recent tragic deaths of more than 30 initiates in Mpumalanga was related to haemorrhage, dehydration and exposure and will form the basis of an ethics article in the future.

About the author

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Routine circumcision

There are huge differences in routine neonatal circumcision (RNC) rates between North Americans and Europeans. The estimated rate of RNC in the USA is about 75% while that in the UK is 8.5%. These differences in attitude can be exemplified by the statements from official paediatric organisations on either side of the ‘pond’. The most recent statement from American Academy of Pediatrics states, “Evaluation of current evidence indicates that the health benefits of newborn male circumcision outweigh the risks and that the procedure’s benefits justify access to this procedure for families who choose it.” The Dutch Paediatric Association has come to an opposite view. They opined that “A broad alliance of medical organisations in the Netherlands has officially adopted the view that circumcision of underage boys without a medical reason violates children’s human rights and contravenes the Dutch constitution. The possible medical advantages are insufficient to justify circumcision on grounds of prevention.”

Circumcision of children and the law in SA

The Children’s Act 38 of 2005 is explicit regarding circumcision. Section 12(8) of the Children’s Act regulates circumcision of male children under the age of 16. It states in full: Circumcision of male children under the age of 16 is prohibited, except when:
(a) circumcision is performed for religious purposes in accordance with the practices of the religion concerned and in the manner prescribed; or
(b) circumcision is performed for medical reasons on the recommendation of a medical practitioner.

From this we can see that there is no legal provision for RNC by a medical practitioner.

Circumcision for HIV prevention

Scientific basis

A recent comprehensive review regarding the prevention of HIV infection gives comment on circumcision as a preventive measure. The authors state that “Male circumcision (MC) has been recognised fairly recently as a potential preventive measure, but its overall impact may depend on the target population. Multiple trials in Africa have shown efficacy of MC in reducing HIV acquisition in heterosexual men by 38%-66%, with uncircumcised men showing an four-fold higher infection risk in sub-Saharan Africa.” These comments are based on three prospective trials (including one local trial) and have formed the basis for the enthusiasm to add circumcision to armamentarium for AIDS prevention. Not all available data supports these experimental findings. An epidemiological study in a high risk population compared previously, mostly traditionally circumcised men, to uncircumcised men and found no evidence of protection.

There is as yet, no evidence that newborn or infant circumcision will be protective. There are also some worries that circumcised men will consider themselves protected from HIV infection and undertake high-risk sexual behaviour. A very recent study among female sex workers in Zambia reported that men often used their circumcision status to try to convince sex workers to forego condoms. While there has been widespread recommendation of using MC for HIV prevention there have been some voices of concern. The practicalities of a massive roll-out campaign in an under-resourced Africa should not be ignored. In the research situation it was consenting adults who were circumcised by doctors but, for practical reasons, it is now being encouraged that newborns be circumcised by nurses in clinics. Fox & Thomson have concluded that “the understandable haste to find a solution to the HIV pandemic means that the promise offered by preliminary and specific research studies may be overstated. This may mean that ethical concerns may be marginalised.” Neonatal or early infant circumcision would then require that newborn boys, more than a decade remote from their sexual debut, would be circumcised using surrogate parental consent engendered by fear.

SA paediatric surgeons and neonatologists have also voiced their concerns by stating that “Neonatal non-therapeutic circumcision to combat the HIV crisis in Africa is neither medically nor ethically justified on the basis of current medical evidence or universally recognised ethical and human rights principles.”

Conclusions

To my mind, the medical benefits of circumcision are still the subject of robust debate. I don’t think that the information around HIV and newborn/infant circumcision is available to ensure that benefits outweigh risks and the programme would be cost-effective when compared to other proven interventions. It is difficult to ascertain the child’s best interests in this case and decisions by surrogates are easily manipulated. If circumcision is to be offered for HIV prevention, then this should be delayed until the age of consent or at least assent.

References

3. Sheldon T. Dutch medical alliance moves to change thinking on male circumcision. BMJ. 2010; 340:c2987. doi: 10.1136/bmj.c2987

JUNE 2013 / MODERN MEDICINE 13
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REFERENCES:
4. South African Registered Package Insert for Picolax dated 06/03/2012.

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ECG Challenge: Test Your Interpretive Skills

Dr Ruan Louw MBChB(Pret), FCP(SA), Cert Cardio (SA)
Cardiologist and Fellow in Cardiac Electrophysiology, University of Leuven, Belgium

Wide complex tachycardia
A distressed 63 year old female patient presented with complaints of lightheadedness and palpitations that had been present for two hours. She had no significant past medical history other than intermittent epigastric pain which had become progressively worse over the past two weeks.
Her heart rate was 152bpm and BP 75/45. Clinical examination revealed a regular heart rate, variable intensity of the first heart sound and intermittent pulsations of the jugular vein.

Statements for consideration (true or false):
1. DC cardioversion should not be attempted until there is more certainty regarding the etiology of the wide complex tachycardia.
2. Supraventricular tachycardia (SVT) with bundle branch block (aberrant conduction) is a more common cause of wide complex tachycardia than ventricular tachycardia (VT).
3. A diagnosis of VT cannot be made when there is one QRS complex for every P wave (no AV dissociation).
4. A broad complex tachycardia that converts to sinus rhythm after the administration of adenosine cannot be a VT.
5. Wide, negatively concordant QRS complexes (all complexes are predominantly negative) in V1-V6 are virtually diagnostic of VT.

Earn a CPD point
When you have the answers, fill them in on the CPD answer sheet at the back of this issue.
Diagnosis: Wide Complex Tachycardia

Wide complex tachycardia (WCT) refers to a cardiac rhythm of more than 100 bpm with a QRS duration of 120 ms or more on the surface ECG.

The possible causes of WCT are:
1. VT - the most common cause of WCT (80%).
2. SVT with bundle branch block (BBB) which could be pre-existing or due to aberrant conduction (rate induced bundle branch block).
3. Tachycardia where the ventricle is activated over an accessory pathway (pre-excitation) such as Wolff-Parkinson-White syndrome.

It is important to be able to differentiate between VT, SVT and pre-excitation as these rhythms have important differences in etiology, therapy and prognosis.

The key ECG features of a pre-excited tachycardia (see figure 1) are:
1. QRS duration > 120 ms
2. Short PR interval (<120 ms)
3. Slurred upstroke of the QRS (delta wave).

Differentiating VT from SVT with BBB

This is a problem commonly encountered by physicians. With the help of focused history taking, clinical examination and ECG analysis you can reliably diagnose and treat most WCT.

A. History

A prior myocardial infarction (MI), congestive heart failure or recent angina pectoris makes VT likely.

B. Clinical

• The presence of intermittent cannon A waves (due to simultaneous atrial and ventricular contraction), as well as variable intensity of the first heart sound (caused by AV dissociation) strongly suggests VT.
• An irregular pulse makes VT highly unlikely.
• VT generally does not respond to carotid sinus massage. Re-entrant SVT usually slows down and may stop with carotid pressure.

C. ECG evaluation

1. Is the rhythm irregular?

An irregular monomorphic rhythm is almost always supraventricular in nature. The irregular rhythm is most commonly due to atrial fibrillation with either aberrant conduction or rarely conduction down an accessory pathway.

2. Are there any diagnostic features of VT?

• The presence of atrio-ventricular dissociation (no consistent relationship between P waves and QRS complexes) is diagnostic of VT. Importantly the absence of atrio-ventricular dissociation does not rule out VT, as retrograde P waves (with or without retrograde conduction block) are found in 10% of VTs.
• Fusion beats or capture beats (see figure 2). Capture beats are conducted supraventricular beats. Fusion beats occur due to simultaneous activation of the ventricle by a conducted supraventricular beat and a ventricular beat.

Figure 1: Pre-excited tachycardia.

Figure 2: Fusion beat and two capture beats.

Figure 3: Negative concordance.

Have you looked beyond the obvious?
3. Are there features highly suggestive of VT (likely VT)?

Any lead:
- Northwest axis (QRS is positive in aVR and negative in I + aVF)
- RS (measured from onset R wave to bottom of S wave) >100ms
- \( V_1/V_T > 1 \) (see figure 4)

RBBB morphology in leads V1-V6
- QRS >140ms
- Positively concordant
- Lead V1
  - “Rabbit ears” (Rsr’ or Rr’) with a taller first than second peak (see figure 5)
  - R wave duration >30ms
  - Monophasic R wave (no notching)
  - qR complex
- Lead V6
  - Dominantly negative QRS (Q wave or rS)
  - Monophasic R (no notching)

LBBB morphology V1-V6 (see figure 6)
- QRS >160ms
- V1
  - R wave >30ms duration
  - RS >70ms (measured from begin R wave to bottom of S wave)
  - Notching of downstroke
- V6
  - Q wave

Lead II only
- R wave peak time (duration from the onset of the QRS to the first change in polarity in Lead II) >50ms

Lead AVR only
- The presence of an initial dominant R-wave
- Width of an initial R- or Q-wave >40 ms
- Notching on the initial downstroke of a predominantly negative QRS complex.

Management of suspected VT: When in doubt, shock it out!

1. Haemodynamically unstable patient

This is suggested by hypotension (arbitrarily defined as a BP <90/60) and/or clinical signs such as loss of consciousness, confusion, pulmonary oedema or angina.

Irrespective of the etiology of a wide complex tachycardia, a hemodynamically unstable patient requires DC cardioversion (conscious patients should be sedated) followed by administration of an appropriate anti-arrhythmic agent such as amiodarone).

2. Haemodynamically stable patient

Either:
- DC cardioversion (after sedation) followed by an appropriate anti-arrhythmic agent such as amiodarone
- Pharmacologic cardioversion (with amiodarone) may be attempted as initial therapy.

A minority of VTs may respond to the administration of either adenosine, calcium channel blockers (such as verapamil), or beta-blockers. Calcium channel blockers and beta-blockers are best avoided as they may cause further deterioration due to a precipitous drop in blood pressure.

3. Initial investigations to find a cause of the arrhythmia

Usually includes blood investigations such as cardiac troponins and serum electrolytes.

4. Refer to a cardiologist
Living Life, Without Compromise.
Non-Specific Low Back Pain: Manage Initially with Reassurance, Activity and Analgesia

Evidence-based management of non-specific low back pain involves reassurance about a favourable prognosis, advice to maintain daily activities and stay active, and the prescribing of simple analgesic medications.

Low back pain is responsible for considerable personal burden, with up to half of those who experience low back pain in any 12-month period seeking primary care. Those with the condition suffer pain, impaired daily living, work and social functioning, psychological problems and reduced quality of life. Despite the extent of this burden and the availability of clinical practice guidelines, there exists an ‘evidence–practice gap’ in which patients often do not receive management aligned with the best quality evidence. This article provides a brief overview of the presentation and evidence-based management of low back pain in primary care.

Although a common problem in general practice, contemporary management of low back pain is variable and often suboptimal, resulting in poorer outcomes for patients and society at large.

By clearly articulating current understanding of low back pain and best-practice management, this article can serve as a guide to clinicians in their day-to-day care of these patients. Patients whose back pain arises from ‘red flag’ conditions such as cancer, inflammatory arthritis, infection or fracture are uncommon in primary care. Although screening for these conditions is mentioned, their management is beyond the scope of this article. Likewise, the management of patients with back pain of presumed neurological origin is also not covered in detail.

Diagnosis of low back pain
Clinical guidelines typically recommend triage of patients presenting in primary care with low back pain into three categories:
- ‘Serious spinal pathologies’, including cancer, infection, spondyloarthritis (eg, ankylosing spondylitis), cauda equina syndrome and vertebral fracture
- Radiculopathy due to compression and/or inflammation of the spinal nerve root
- Non-specific low back pain (covering patients not included in either of the above two groups).

Serious spinal pathologies
Patients with ‘serious spinal pathologies’ make up about 1% of the presentations of low back pain in primary care. Clinical suspicion of these conditions is raised by the presence of clusters of ‘red flags’, which may include recent unexplained weight loss, fever, saddle anaesthesia and recent trauma to the back (Table 1). Immediate imaging is appropriate for patients in whom there is a strong suspicion of serious spinal pathology (Table 2). It should be noted that the diagnostic probabilities change with age and the risk of serious causes of low back pain such as cancer, aortic aneurysm and vertebral fracture are increased in older patients.

Radiculopathy
Radiculopathy due to compression and/or inflammation of the spinal nerve root is recognised by dermatomal sensory loss, myotomal power loss and reduced

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Key points
- Low back pain is one of the most common and costly musculoskeletal conditions treated in primary care.
- Patients accessing primary care for low back pain should be screened for serious pathologies such as cancer, fracture and systemic diseases, but these conditions are very rare in such patients.
- Evidence supports the providing of reassurance about a likely good prognosis and advice to stay active, and the prescribing of simple analgesia. Most patients recover well when treated in this manner.
- Routine imaging and bed rest are not recommended.
Table 1

Alerting features of serious spinal pathologies (‘Red flags’)^2

<table>
<thead>
<tr>
<th>Features</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Symptoms and signs of infection (eg, fever)</td>
<td>Infection</td>
</tr>
<tr>
<td>• Risk factors for infection (eg, underlying disease process, immunosuppression, penetrating wound, intravenous drug use)</td>
<td></td>
</tr>
<tr>
<td>• Significant trauma</td>
<td>Fracture</td>
</tr>
<tr>
<td>• Minor trauma (if age over 50 years, history of osteoporosis and/or taking glucocorticoids)</td>
<td></td>
</tr>
<tr>
<td>• History of malignancy</td>
<td>Tumour</td>
</tr>
<tr>
<td>• Age over 50 years</td>
<td></td>
</tr>
<tr>
<td>• Failure to improve with treatment</td>
<td></td>
</tr>
<tr>
<td>• Unexplained weight loss</td>
<td></td>
</tr>
<tr>
<td>• Pain at multiple sites</td>
<td></td>
</tr>
<tr>
<td>• Pain at rest</td>
<td></td>
</tr>
<tr>
<td>• Sudden onset/absence of aggravating features</td>
<td>Aortic aneurysm, leak or rupture</td>
</tr>
<tr>
<td>• Associated collapse/hypotension</td>
<td></td>
</tr>
<tr>
<td>• Pain not aggravated by spinal movement</td>
<td></td>
</tr>
<tr>
<td>• Abdominal pain radiating to back</td>
<td></td>
</tr>
<tr>
<td>• Urinary retention</td>
<td>Cauda equine syndrome</td>
</tr>
<tr>
<td>• Bilateral neurological symptoms and signs syndrome</td>
<td></td>
</tr>
<tr>
<td>• Saddle anaesthesia</td>
<td></td>
</tr>
</tbody>
</table>

The presence of these features requires very urgent referral

Adapted with permission from: Evidence-based Management of Acute Musculoskeletal Pain. Australian Acute Musculoskeletal Pain Guidelines Group; 2003.^2

reflexes. Spinal stenosis involves the narrowing of the spinal canal in older patients; these patients present with radiating leg pain and pseudoclauclaudication. Together radiculopathy and spinal stenosis account for around 5% of presentations. For both conditions, imaging is necessary only if surgery is being considered (Table 2).^2

A diagnosis of radiculopathy can typically be made when leg pain is more severe than back pain, there is unilateral pain that radiates below the knee, there is a positive straight-leg raise test and neurological signs (weakness, sensory changes, reduced reflexes) are present in the distribution of a spinal nerve.^4

Non-specific low back pain

Non-specific low back pain is the low back pain in patients who do not have serious spinal pathologies or radiculopathy/spinal stenosis; these patients comprise the majority (about 94%) of presentations of low back pain in primary care. The term reflects the fact that current diagnostic techniques are unable to reliably identify the pathoanatomic source or sources of pain in these patients.

Although numerous attempts have been made to divide this group into meaningful subgroups based on assumed pathology, symptom pattern or treatment response, none has demonstrated the necessary validity and reliability to achieve universal acceptance. A review of diagnostic procedures, including physical assessments conducted in the clinic, revealed little utility for valid subdivision of this group.^5 The designation ‘non-specific’ is intended to include all patients whose pain is presumed to be of a musculoskeletal (sometimes called mechanical) origin. It separates these patients from those with an underlying systemic condition or tumour (the serious spinal pathologies group) and those with pain of a presumed neurological origin (the radiculopathy group).

Routine imaging is generally not necessary in patients with non-specific low back pain of short duration (Table 2).^3 Imaging is discussed in more detail later in the article.

Prognosis

The outlook for patients who present for care with a short history of non-specific low back pain is generally good; most of these patients will improve quickly. However, a small proportion (fewer than 5%) develop persisting symptoms that are severe and disabling.^6 Of those who do recover early, about one quarter will have a recurrence in the next 12 months.^7 People who present with more chronic symptoms are less likely to recover quickly or completely.^8

Recent studies have explored the potential of stratifying patients according to their risk of developing long-term symptoms at initial presentation.^9 People at low risk of developing persistent disabling low back pain need minimal intervention, but those at greater risk may benefit from targeted intervention tailored to their risk indicators. Prognostic studies have suggested that people with greater pain and disability at presentation and/or indicators of psychological dysfunction (catastrophic thinking, fear, anxiety, depression) are more likely to experience ongoing symptoms.^10 Other factors that have also been found to raise the likelihood of poor outcome include older age, poor general health, poor relations with work colleagues, physically demanding work and the availability of compensation.^11

Patients with radiculopathy have a generally less favourable prognosis than those with non-specific low back pain.

Managing non-specific low back pain

The initial management of patients with non-specific low back pain involves:

• Provision of reassurance and advice to maintain daily activities and stay active, and
Non-specific Low Back Pain (continued)

• Prescription of simple analgesic medication and/or NSAIDs if required (see the box). An approach to management is outlined in the flowchart.

Advice and reassurance

Advice and reassurance for patients should include the components listed below.
• Encourage patients to:
  – Stay active, continue daily activities and refrain from extended bed rest
  – Continue work activities (modified if necessary); work participation plays an important role in recovery
  – Take responsibility for their own management; self-management is the cornerstone of effective treatment.
• Reassure patients that:
  – there is no reason to suspect serious damage or disease; such conditions are extremely rare
  – The prognosis is likely to be good; most people improve rapidly and severe ongoing limitations are uncommon
  – It is important to understand that ‘hurt does not mean harm’
  – They should maintain a positive attitude.
Avoid giving patients diagnostic labels based upon presumed pathophysiology such as disc degeneration, disc herniation or arthritis. Imaging findings showing these pathologies are seen in many people without low back pain, so their relation to back pain is unclear. Also avoid advising patients to let pain be the guide for return to usual physical activity, as patients should keep moving despite pain.

It is important to address workplace issues at the outset.12 Having an understanding of the patient’s work context and job demands in relation to their physical capacity and beliefs may help to prevent and/or reduce work disability. Communicating with the workplace/employer to facilitate remaining at work, with modified duties if necessary, can be helpful, as can strategies to promote prompt return to work.

There is often a mismatch between the patient and the physician about expectations and beliefs about low back pain, and open communication during the consultation is crucial.13 There are several commonly held beliefs that may

<table>
<thead>
<tr>
<th>Clinical situation</th>
<th>Immediate imaging</th>
<th>Imaging type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major risk factors for cancer (new onset of low back pain with history of cancer, multiple risk factors for cancer, or strong clinical suspicion for cancer)</td>
<td>Radiography plus erythrocyte sedimentation rate*</td>
<td>Magnetic resonance imaging</td>
</tr>
<tr>
<td>Risk factors for spinal infection (new onset of low back pain with fever and history of intravenous drug use or recent infection)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk factors for or signs of the cauda equina syndrome (new urine retention, faecal incontinence, or saddle anaesthesia)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe neurological deficits (progressive motor weakness or motor deficits at multiple neurological levels)</td>
<td></td>
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</tr>
</tbody>
</table>

Defer imaging until after a trial of therapy

• Weaker risk factors for cancer (unexplained weight loss or age over 50 years)
  – Risk factors for or signs of ankylosing spondylitis (morning stiffness that improves with exercise, alternating buttock pain, awakening because of back pain during the second part of the night, or younger age [20 to 40 years])
  – Risk factors for vertebral compression fracture (history of osteoporosis, use of glucocorticoids, significant trauma or older age [over 65 years for women or over 75 years for men])
  – Signs and symptoms of radiculopathy (back pain with leg pain in an L4, L5, or S1 nerve root distribution or positive result on straight leg raise or crossed straight leg raise test) in patients who are candidates for surgery or epidural glucocorticoid injection
  – Risk factors for or symptoms of spinal stenosis (radiating leg pain, older age or pseudo-claudication) in patients who are candidates for surgery

No imaging

• No criteria for immediate imaging and back pain improved or resolved after a one-month trial of therapy
• Previous spinal imaging with no change in clinical status

* Consider magnetic resonance imaging if the initial imaging result is negative but a high degree of clinical suspicion for cancer remains.


Effective interventions for acute and persistent non-specific low back pain

Acute pain
• Paracetamol
• NSAIDs
• Superficial heat
• Advice to remain active

Persistent pain
• Paracetamol
• NSAIDs
• Exercise therapy
• Multidisciplinary rehabilitation
• Spinal manipulation

TabLe 2

Acute low back pain: suggested imaging strategy and timing3

<table>
<thead>
<tr>
<th>Clinical situation</th>
<th>Imaging type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate imaging</td>
<td>Radiography plus erythrocyte sedimentation rate*</td>
</tr>
<tr>
<td>Defer imaging until after a trial of therapy</td>
<td>Magnetic resonance imaging</td>
</tr>
<tr>
<td>No imaging</td>
<td></td>
</tr>
</tbody>
</table>

* Consider magnetic resonance imaging if the initial imaging result is negative but a high degree of clinical suspicion for cancer remains.

result in poorer outcome, including the following:\textsuperscript{14}

- The notion that fluctuations in pain intensity signify actual or potential anatomical damage/injury
- Fear of performing particular activities or movements (including work) because of concerns of further damage
- Catastrophic beliefs about long-term prognosis
- Expectations regarding the need for imaging or investigations
- Expectations associated with particular treatments, particularly a preference for passive treatments. Eliciting and addressing erroneous beliefs and identifying enablers and barriers that are likely to influence treatment adherence are an important part of the initial consultation.\textsuperscript{15} The presence of high levels of symptom reporting, psychological distress and strongly held mistaken beliefs should alert the GP to an increased likelihood of poor outcome. Addressing these factors early is likely to be important and may justify earlier follow up and active treatment.

**Pain control**

**Medications**

The goal of analgesic administration in the treatment of non-specific low back pain is to reduce, rather than abolish, pain in order to facilitate continued activity. A step up approach to medication use is recommended, as outlined in the Therapeutic Guidelines: Rheumatology.\textsuperscript{16} Paracetamol is the safest first choice, but consumption of the safest maximum dose on a time-continuous basis rather than on an ad hoc or as required basis should be recommended. Specific dosage recommendations such as these are important given evidence suggesting patients routinely underdose themselves, potentially leading to inadequate pain control.\textsuperscript{17}

NSAIDs are an alternative to paracetamol but can also be combined with paracetamol. However, their potential benefits need to be considered in relation to their potential harms, particularly in high-risk patients. They should be prescribed for short periods of time (eg, up to three weeks), and patients should be monitored for adverse effects.

If analgesia remains insufficient to allow normal functioning, immediate-release opioids in an appropriate dose for a short period may be considered.\textsuperscript{18} It should be noted that although administering stronger analgesics is intuitively reasonable, there is conflicting evidence as to whether this results in improved clinical outcomes. Any recommendations should take the risk profile and likelihood of side effects of these drugs into account, and patients should be monitored accordingly.

**Other options**

Non-pharmacological analgesic options in the treatment of non-specific low back pain include the use of heat packs and wraps, for which some evidence of effectiveness exists.\textsuperscript{19} Heat packs and wraps are low cost and have few reported side effects, and they also enable patients to take responsibility for their pain relief.

**Managing recurrences**

It should be noted that recurrences following an initial episode of low back pain are common.\textsuperscript{20} There is little research to recommend strategies that reduce the risk of recurrence, but patients should be alerted to its likelihood. Patients can be advised to follow the same activity and medication recommendations in the event of a recurrence. This will reinforce the idea of self-management and may obviate the need for consultation for future episodes.

Many patients will have some degree of low-level residual pain that persists over months. These symptoms are not necessarily indicative of serious pathology and do not usually interfere with normal function.\textsuperscript{21}

**Managing persistent pain**

Management of patients with non-specific low back pain who have severe pain persisting beyond two to three weeks should include reinforcement of the advice and reassurance provided previously.

**Pharmacological treatment options**

If the patient is still regularly taking an immediate-release opioid, switching to an equivalent dose of a modified-release opioid preparation may be considered, again for a pre-specified time period (eg, up to 12 weeks).\textsuperscript{22}

International guidelines are inconsistent on recommendations regarding anti-depressants and muscle relaxants.\textsuperscript{23} Some recommend antidepressants only where there is depressive comorbidity; others suggest that they can be used as an analgesic; however, the most recent Cochrane review on the subject does not recommend their use for low back pain.\textsuperscript{24} Trial evidence suggests that muscle relaxants are more effective than placebos for short-term relief from low back pain but the incidence of drowsiness, dizziness and other side effects is high.\textsuperscript{25}

**Physical therapy options**

There are numerous physical therapy options available for patients with persisting low back pain, but only structured exercise programmes and spinal manipulative therapy are supported by sufficient evidence to warrant inclusion in most guidelines.\textsuperscript{26} Allied health professionals typically deliver these physical therapies over a six to twelve-week course.

Of these physical therapies, exercise programmes should be the first choice of treatment. Although therapeutic effectiveness may be equivalent to interventions such as spinal manipulative therapy, exercise provides additional benefits over more passive therapies. Exercise reinforces the principle that patients should be physically active and encourages patients to take an active role in management of their health. There is some evidence to suggest that regular exercise may have a role in prevention of recurrences.\textsuperscript{27} Additionally, increasing physical activity has been shown to confer numerous benefits beyond that for low back pain, for example for cardiovascular and mental health.

Importantly, simple advice ‘to do some exercise’ is probably ineffective. Exercise programmes should be supervised, high dose and individually prescribed, and should include stretching and strengthening components. Beyond these general principles, however, there is little evidence to support the superiority of one exercise type over another.\textsuperscript{28} This being the case, clinician expertise and patient preference may guide programme selection.
CHIROPRACTIC
- A SOLUTION FOR BACK PAIN

Staying active with the help of chiropractic treatment may well be the best solution

Scientific research shows that you should remain active - prolonged bed rest weakens the bone and muscles and reduces your chances of a full recovery - you may be advised to do gentle exercise to ease pain and help your body to recuperate.

Are you?
* spending hours a day sitting at a desk or computer?
* Slouch in front of the TV?
* Sleep in a bed that is too hard or soft?
* Hunching you back and shoulders in stressful situations?

Repeating daily activities such as bending, lifting and twisting may result in a “bad back”.

Treating the cause not the symptoms: as you go through life a slight loss of proper movements of the bones / joints can interfere with the healthy working of your spine and the nerves that pass through it. This can lead to pain. Chiropractic, unlike painkilling drugs treats the cause of pain not just the pain itself.

To free stiff joints and remove spinal nerve irritation, gentle specific adjustments (the chiropractic word for manipulation) can be done by hand. This effective drug free treatment is generally painless, although short-term discomfort can be experienced if your back is very painful. Ice/heat treatments and massage may be recommended.

For more information on chiropractic or where to find a CASA CHIROPRACTOR:
Visit the CHIROPRACTIC ASSOCIATION OF SOUTH AFRICA website
www.chiropractic.co.za

or call us on 0861 887 772

email: info@chiropractic.co.za
   casa1@telkomza.net

With acknowledgement to the British Chiropractic Association
An approach to managing low back pain

Patient presents to GP with low back pain

Diagnostic triage – take history and perform physical examination to exclude:
- serious spinal pathologies (look for red flags)*
- radiculopathy

Serious spinal pathology suspected
- Refer patient urgently to appropriate specialist

Radiculopathy suspected
- If no progressive or major motor weakness, manage patient in general practice

Neither serious spinal pathology nor radiculopathy suspected – patient diagnosed as having non-specific low back pain
- Manage patient in general practice

• Provide patient with:
  - Reassurance of likely favourable prognosis
  - Encouragement to stay active and continue normal daily activities and work, despite pain
  - Simple analgesia, pharmacological (paracetamol and/or NSAIDs; immediate-release opioids if inadequate response to simple pain medication) and/or nonpharmacological (heat packs and wraps)

• Address patient's workplace issues if relevant
• Elicit and address any erroneous beliefs the patient has about back pain
• Assess patient's level of psychological distress
• Imaging is not required

Review patient after one to two weeks if necessary

Recovery (low-level residual pain may persist)
- Recurrences may occur – increased physical activity and education may help in prevention

Persistent pain
- Consider:
  - modified-release opioids
  - exercise programme
  - referral

Recalcitrant pain
- Consider:
  - further investigations
  - referral to multidisciplinary rehabilitation clinic

Back-related leg pain diagnosed as radiculopathy
- Consider:
  - use of glucocorticoids (epidural or oral)
  - referral

*See Table 1 for list of red flags for serious spinal pathology
Ongoing contact with a professional is likely to be necessary to maintain motivation and adherence.24 A range of allied health professionals, including physiotherapists, osteopaths and chiropractors, are able to provide care to patients with low back pain. However, these professions are not all alike in their focus on encouragement of physical activity and self-management, and unfortunately this focus also does not necessarily concentrate along professional lines as individuals within each profession differ in their views. Communication and building relationships with allied health care professionals in your area may be worthwhile to find some that you can depend on to administer evidence-based care.

Treatments with no or limited evidence of efficacy

Numerous treatments commonly used in the treatment of low back pain are not supported by evidence and are not recommended. They include antidepressant medications, radiofrequency denervation, injections and traction.21,25-27 Other treatment options that are currently backed by limited evidence are also not recommended. These include acupuncture, lumbar supports, massage and transcutaneous electrical nerve stimulation.29,30

Managing recalcitrant low back pain

If sufficient improvement in persistent non-specific low back pain has not occurred despite a trial of best practice management as outlined above, further options can be considered. These include further investigations and referral to a multidisciplinary rehabilitation clinic (these may be referred to as pain clinics, depending on the setting).

Persistent, debilitating low back pain is often accompanied by problems of physical, psychological and social origin. These patients are unlikely to respond to a simple unimodal course of a physical therapy. Although the causal associations are not well understood, it is likely that effective management of these patients requires consideration of all of these factors.

There is evidence to support the effectiveness of multidisciplinary rehabilitation programmes in this population of patients with long-term, severe symptoms.23 These programmes usually involve intensive treatment, including structured exercise, education and instruction in self-management, functional training and tailored psychological management, and are delivered by various health professionals (eg, physical therapists, rehabilitation specialists, psychologists, occupational physicians and occupational therapists).

An important feature of a successful multidisciplinary program appears to be the volume of therapy provided; successful programs generally involve at least 100 hours of therapy.23 Programmes should have a clear and defined focus on improving and sustaining the functional capabilities of patients.

Managing back-related leg pain

Low back pain accompanied by referred pain into one or both legs is usually associated with more significant loss of function.23 In many instances, referred pain does not indicate radiculopathy, and the treatment recommendations are the same as those for non-specific low back pain.

For those patients diagnosed with radiculopathy (typically, leg pain is more severe than back pain, there is unilateral pain that radiates below the knee, there is a positive straight-leg raise test, and other neurological signs are present), the prognosis is generally less favourable than for those with non-specific low back pain.4 Although specific mechanisms are not completely understood, it is likely pain stems from inflammation surrounding and/or compression of the nerve roots in the lumbar segments, usually due to herniation of the intervertebral disc.4

Similar to the treatment recommendations for non-specific low back pain, management in patients with radiculopathy includes education regarding the condition, advice to stay active and simple analgesic medications. There is also no need for routine imaging at the initial presentation. Translumbar, transsacral or transforaminal (or ‘nerve root’) epidural glucocorticoid injections may provide modest short-term (three to six weeks’) pain relief, although evidence is somewhat inconsistent.3,33 A two to three-week trial of oral glucocorticoid may be another treatment option but the efficacy of this has not been established.16

Patient review

Persistent lack of improvement in the face of appropriate management warrants patient review by the primary care clinician or referral to a colleague more experienced in low back pain management. Unfortunately a common pattern seen in patients with persistent low back pain is that the same physical treatments have been administered repeatedly for months or years with little sustained effect. In these cases, discussion with the treating clinician about alternative management options or referral elsewhere may be appropriate.

Role of imaging

Imaging should be restricted to those patients with low back pain in whom there is a strong suspicion of serious spinal pathology or surgical referral is being considered for persisting radicular features (Table 2).3 Imaging (plain radiographs, CT scans, MRI) of patients with non-specific low back pain in the first instance has not been shown to improve clinical management and may even lead to poorer clinical outcomes. There is a poor correlation between clinical features and imaging findings, and abnormal findings are common in people without back pain and increase with age. For example, a study of MRI in people without back pain over the age of 60 found that 21% had spinal stenosis, 36% had a herniated disc and 90% had a bulging or degenerated disc.36

Referral for imaging is associated with increased costs and inconvenience and with exposure to unnecessary radiation, is unlikely to improve patient satisfaction and may reinforce negative beliefs regarding anatomic injury.3,36 National guidelines from around the world uniformly recommend that imaging not be performed for patients with non-specific low back pain of short duration unless there are ‘red flags’.3,36,37,38

Results of investigations such as electromyography, pathology or nerve conduction studies similarly show little correlation with reported symptoms.

Continued on page 35
The name is TAV,...

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- Pneumonia
- Sinusitis
- Urinary Tract Infections
- Skin And Soft Tissue Infections
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Chronic obstructive pulmonary disease

COPD describes diseases of the lung that are associated with airway obstruction. COPD is a progressive condition which is partially reversible through treatment, especially when diagnosed early in its clinical course.

COPD covers:
- Chronic bronchitis – a chronic, inflammatory condition of the bronchi. It is characterised by coughing and expectoration of sputum, occurring on most days, lasting for three months or longer, for at least two consecutive years.
- Emphysema – a respiratory disorder characterised by enlargement and eventual destruction of the alveoli. It is characterised by a chronic airflow limitation, airway inflammation, structural changes in the airways and lung tissue, and systemic effects such as pulmonary hypertension or cardiovascular disease. Treatment generally includes lifestyle changes and medication.

Although asthma is a condition associated with airway obstruction, and many people with COPD also suffer from asthma, asthma is not generally included under the COPD category.

Asthma

Asthma is a common chronic airway disorder characterised by variable and recurring symptoms, reversible airflow obstruction and bronchospasm. Symptoms may include wheezing, coughing, shortness of breath, and chest tightness. While there is no cure for asthma, symptoms can be improved. The most effective treatment is identifying the triggers and eliminating them.

If trigger avoidance is insufficient, then medication is recommended.

Surveys in the US show that the prevalence of asthma has increased from 2001-2010 and is currently at its highest level. It is higher among children, adult females and those with family income below the poverty level. As of 2011, 235m - 300m people were affected globally, with approximately 250 000 deaths each year.

Treatment

**Inhaled corticosteroids**

Inhaled corticosteroids are the most effective long-term medication to reduce airway inflammation and mucous production. Their use leads to better asthma control with fewer symptoms and flare-ups and less need for hospitalisation. Inhaled steroids prevent symptoms, they do not relieve symptoms.

**Mast cell stabilisers**

These are only available in inhaled forms (cromolyn sodium). They have an anti-inflammatory action and prevent asthma symptoms. They need three to four weeks to begin working. They need to be taken two to four times a day to control asthma long-term. They have very few side-effects.

**Leukotriene modifiers**

These are chemicals that occur naturally in the human body and cause tightening of the airway muscles and mucous production. The modifiers (montelukast, zafirlukast and zileuton) work by blocking the action of leukotrienes in the body, to improve airflow and reduce asthma symptoms. The most common side-effects are headaches and nausea. Leukotriene modifiers may change the body’s response to other drugs, such as warfarin.

**Bronchodilator medication**

**Beta2-agonists (short- and long-acting forms)**

Short-acting beta2-agonists (SABA), such as salbutamol and fenoterol are the first line in asthma treatment as symptoms are quickly relieved. They work within 20 minutes and last four to six hours. They can prevent exercise-induced asthma if used 15-20 minutes before exercise. The inhaled forms are best for treating sudden and severe or new onset symptoms. Long-acting beta2-agonists (LABA), such as salmeterol and formoterol are used for better control, not for relief. These drugs take longer to work and the benefits last longer, even up to 12 hours. Side-effects include nervous or shaky feelings, over-excitement or hyperactivity, increased heart-rate, and (rarely) upset stomach or trouble sleeping.

**Anticholinergics (short- and long-acting)**

Anticholinergic medications, such as ipratropium bromide and tiotropium bromide, provide additional benefits when used in combination with SABAs in those with moderate or severe symptoms. Ipratropium is used four times a day whereas tiotropium is only used once a
Ipratropium bromide is a muscarinic antagonist that is structurally related to atropine, but considered safer and more effective for inhalation use. It is used as a bronchodilator in the management of cholinergic-mediated bronchospasms associated with COPD and in the treatment of rhinorrhea associated with the common cold or with allergic or non-allergic seasonal rhinitis.

Anticholinergic bronchodilators (or muscarinic antagonists) block the parasympathetic nerve reflexes that cause the airways to constrict, thereby allowing airways to remain open. Muscarinic receptor antagonists bind to muscarinic receptors and inhibit acetylcholine mediated bronchoconstriction. They are used more often to treat COPD than asthma.

Ipratropium bromide is more often to treat COPD than asthma.

Theophylline (dimethylxanthine) has been used for over 80 years in the treatment of airway disease. Originally it was used as a bronchodilator but the required relatively high doses were associated with frequent side-effects, resulting in a decline in use as inhaled beta2-agonists became more widely used. More recently it has been found to have anti-inflammatory effects in asthma and COPD at lower concentrations.

Theophylline is usually used as an add-on therapy in asthma patients not well controlled on corticosteroids with or without LABA and in COPD patients with severe disease not controlled by bronchodilator therapy.

Low dose theophylline may be useful in reversing corticosteroid-resistance in COPD and asthma.

Combination medications

There is evidence that corticosteroid/beta2-agonist combination therapy has complimentary, additive, and synergistic inhibiting effects on pro-inflammatory signalling pathways, inflammatory mediator release, and recruitment and survival of inflammatory cells. In the asthmatic patient, the enhanced anti-inflammatory activity is greater than using either drug alone. The combined activity (see figure) may also overcome the reduced sensitivity to inhaled corticosteroids that have been reported in some patients with COPD.

In patients with COPD, treatment with an inhaled corticosteroid (ICS) is associated with an increased risk of pneumonia which should be carefully considered when assessing the risk/benefit ratio of ICS/LABA combinations.

Subphenotyping patients with COPD (such as frequent exacerbations, sputum eosinophilia, and mixed asthma/COPD phenotype) might help to identify patients who are most likely to benefit from the addition of ICS to bronchodilating treatments.

Inhalation delivery devices

The metered dose inhaler (MDI) with spacer is more commonly prescribed than nebulisation for bronchodilator therapy when treating mild to moderate asthma. Nebulisers, though, require very little effort to use, especially if a patient’s co-ordination is not sufficiently appropriate to use an MDI. MDIs require a level of skill to correctly deliver medicine to the lungs. When used incorrectly, MDIs may deposit most of the medication into the back of the mouth rather than into the lungs. This can cause hoarseness and thrush.

Unlike inhalers which generally require the patient to breathe in when releasing the medication, medication in a nebuliser flows continuously, allowing the patient to breathe normally during the treatment. The main advantage of nebulised drugs is that they are deposited directly into the respiratory tract allowing higher drug concentrations to be achieved in the bronchial tree and pulmonary bed with fewer adverse effects than when the systemic route is used. Newer nebulisers are small enough to be portable, although not as portable as inhalers which can fit into a pocket. There are three types of nebulisation systems: ultrasonic, jet and mesh nebulisers. Of the three, mesh nebulisers are the most effective. They are also the most compact, quietest and most rapid, which improves patient compliance.
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Fenoterol acts to relax bronchial smooth muscle
- Indicated for:
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  - Symptomatic treatment of acute asthmatic episodes of bronchospasm in COPD
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IPRATROPIUM BROMIDE

When they need **Room to breathe in COPD**
- Maintenance treatment of bronchospasm associated with chronic obstructive pulmonary disease
- Anticholinergic properties - well tolerated and does not affect mucociliary clearance
- Onset of effect from 5 – 15 minutes, however, long lasting effect for up to 6 – 8 hours in some patients
- Adco-Ipratropium can be used concomitantly with other medications such as sympathomimetic bronchodilators

**Adco-Nebafen**
NEBRAFEN

When they need to **Breathe even easier in asthma**
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- Isotonic and preservative free and is ready for use. No dilution needed

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- Indicated for reversible bronchospasm associated with obstructive pulmonary disease
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- Activates pulmonary β2-receptors to relax bronchial smooth muscle and decrease airway resistance

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Adco-Fenoterol: 0.5 mg/2 mL Reg. No. 55/10/23/0195. Each 2 mL solution contains 0.5 mg fenoterol hydrobromide. Adco-Fenoterol 1.25 mg/2 mL Reg. No. 55/10/23/0195. Each 2 mL solution contains 1.25 mg fenoterol hydrobromide. Adco-Nebafen: Reg. No. 35/10/21/0000F. Each 4 mL ampoule contains fenoterol hydrobromide 2.5 mg and ipratropium bromide 0.5 mg. Adco-Ipratropium 0.25 mg/2 mL Reg. No. 35/10/21/0270. Each 2 mL solution contains 0.25 mg ipratropium bromide equivalent to 0.25 mg ipratropium bromide anhydrous. Adco-Combineb: Reg. No. A19/10/21/0328. Each 2 mL solution contains ipratropium bromide equivalent to 0.50 mg ipratropium bromide anhydrous and salbutamol sulphate equivalent to 2.50 mg salbutamol base.

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References:

Studies have shown 1 in 3 patients receive biologic monotherapy in RA 1-4  
ACTEMRA monotherapy offers comparable disease control to ACTEMRA combination therapy 5

COMPOSITION:
Tocilizumab 20 mg/ml per vial.

INDICATIONS:
Indicated for moderate to severe rheumatoid arthritis (RA) in combination with methotrexate (MTX) in adult patients who responded inadequately to Disease Modifying Anti-rheumatic Drugs (DMARDs) or Tumour Necrosis Factor (TNF) antagonists. Given as monotherapy if intolerant to MTX or where continued treatment with MTX is inappropriate.

DOSAGE:
8 mg/kg body weight, once every four weeks. Not recommended for use in children below 18 years. Dilute to a final volume of 100 ml with sodium chloride 0.9 % solution for injection, then administer as an intravenous infusion over 1 hour.

CONTRA INDICATIONS:
Hypersensitivity to tocilizumab or to any of the excipients. Active, severe infections.

WARNINGS AND PRECAUTIONS:
Interrupt treatment if a serious infection develops. Exercise caution in patients with a history of recurring or chronic infections. Screen for latent TB infection. Evaluate for diverticulitis. Treat anaphylactic reactions immediately. Monitor ALT and AST levels, neutrophils, lipids and platelets. SIDE EFFECTS: Infections, infusion reactions, gastrointestinal perforations. Laboratory abnormalities include neutropenia, thrombocytopenia, elevations in hepatic transaminase and lipid parameters.

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30Oct0713
Therapy for rheumatoid arthritis (RA) is directed at interrupting the inflammatory process, which, if left unchecked, causes irreversible joint damage, deformity and long-term functional impairment. The earlier therapy is initiated, the better the long-term outcomes in patients with RA. Methotrexate is the main disease-modifying anti-rheumatic drug (DMARD) used for the treatment of RA and remains the gold standard of first-line therapy. However, an emerging class of biological DMARDs is now available for patients who fail to respond to methotrexate monotherapy and/or combination therapy with other traditional DMARDs. Treatment with these new biological DMARDs is designed to specifically target the immune response underlying the development and progression of RA.

The non-TNF inhibitors are a class of biological DMARDs that inhibit pro-inflammatory cytokines other than TNF which are also considered to play a central pathogenic role in the development of rheumatoid synovitis and RA. The main non-TNF inhibitors used to treat patients with RA are tocilizumab, abatacept and rituximab. Several emerging biological agents are in the pipeline and undergoing clinical trials, eg, ocrelizumab, ofatumumab, epratuzumab and velutuzumab.

**Non-TNF Inhibitors**

Non-tumour necrosis factor (non-TNF) inhibitors are highly effective biological therapies that have radically changed how rheumatoid arthritis is managed, helping patients achieve not only disease control but long-term remission.

**Tocilizumab**

Tocilizumab is a recombinant humanised monoclonal antibody that binds both soluble and membrane-bound inter-leukin-6 (IL-6) receptors. IL-6 is a pro-inflammatory cytokine found in the synovium of patients with active RA. It acts as a major inducer of the hepatic acute phase proteins, such as C-reactive protein, and serum levels of IL-6 correlate with markers of disease activity in RA. IL-6 promotes osteoclast maturation, which is responsible for bone erosion and radiographic abnormalities in RA. The cytokine also plays a role in inducing B-cell differentiation and in T-cell and macrophage activation.

In trials of tocilizumab in patients with RA, clinical improvements were observed as early as four weeks after the initiation of therapy, with improvement becoming most pronounced by week 12.5 Furthermore, data from a one-year open-label trial of 158 patients confirm the superiority of tocilizumab over traditional DMARD therapy in slowing the development of radiographic changes.

It is desirable to co-prescribe biological DMARDs with methotrexate, and combination therapy with tocilizumab and methotrexate has been shown to increase the efficacy of the drug.

**Indication**

Tocilizumab is clinically indicated for the treatment of moderate-to-severe RA. It can be prescribed by rheumatologists (or clinical immunologists with experience managing RA) for the treatment of adult patients with severe active RA who fail to achieve adequate disease remission following either:

- Six months of treatment (including at least three months of continuous treatment) with at least two traditional DMARDs, one of which must be methotrexate unless contraindicated, or
- An unsuccessful trial of therapy with a TNF inhibitor.

**Dosing and administration**

Tocilizumab is administered as a monthly intravenous infusion. The recommended dose is 8mg/kg administered every four weeks. The maximum recommended dose of tocilizumab is 800mg per infusion.

**Side effects**

Upper respiratory tract infection was the most commonly documented adverse event associated with tocilizumab in clinical trials. Headache, skin eruptions, stomatitis and fever were less common. Pathology abnormalities encountered during clinical trials included elevated lipid profiles, neutropenia and abnormal levels of liver enzymes. Significant elevations in total cholesterol, triglyceride and HDL levels were also observed, the significance of which is yet to be determined.

Laboratory monitoring of lipid parameters at four- to eight-weekly intervals for the first six months of treatment and at three-monthly intervals thereafter is advisable. Furthermore, the institution
of cholesterol-lowering agents is sometimes warranted. A dose-dependent, reversible neutropenia can occur at any time during treatment. Treatment interruption may be considered following discussion with the treating specialist if the patient’s neutrophil count falls to less than $1 \times 10^9\text{U/L}$.

Transient liver function abnormalities (eg, elevated levels of transaminase and bilirubin) may also occur in a dose-dependent manner, predominantly involving aspartate aminotransferase more than alanine aminotransferase. Treatment interruption may be appropriate in cases where hepatic transaminase levels exceed three to five times the upper limit of normal. In most patients, liver function test abnormalities normalise within eight weeks of the last infusion.46

Cases of bowel perforation complicating diverticulitis have also been reported in association with tocilizumab therapy. Patients with a history of intestinal ulceration, diverticulitis and concomitant corticosteroid use should be closely monitored for symptoms suggesting potential gastrointestinal toxicity during treatment with tocilizumab.47

### Abatacept

Abatacept is a soluble fusion protein comprising the human cytotoxic T-lymphocyte antigen 4 (CTLA-4) immunoglobulin and the Fc portion of human IgG1.48

RA has traditionally been regarded as a T-cell-mediated disease. In patients with RA, autoantigen-specific T-cells are activated and expand in joints and/or lymph nodes in response to stimulation by antigen-presenting cells (APCs) that convey arthritis-related peptides.49 For T-cell activation to occur in these patients, two equally important process- es or signals are required:

- Recognition of a specific antigen by the T-cell – this ‘first signal’ involves binding of the APC with the T-cell receptor
- A co-stimulatory signal – this ‘second signal’ involves binding of an APC co-stimulatory ligand to a T-cell receptor, forming a receptor-ligand pair.48

Abatacept acts as a selective inhibitor of this co-stimulatory ‘second signal’ required for T-cell activation. This is achieved by abatacept binding to CD-80 and CD-86 and thus inhibiting T-cell response. Clinical responses to abatacept have been observed as early as day fifteen following treatment initiation. Continued clinical improvements were recorded until trial conclusion at 12 months.49 This suggests a slightly slower mode of action than the cytokine inhibitors. A statistically significant reduction in radiographical progression compared with placebo after one year of treatment has also been noted.49

### Indication

Abatacept is indicated in combination with methotrexate for the treatment of moderate-to-severe RA in adult patients who have experienced an insufficient response or intolerance to therapy with traditional DMARDs.

### Dosing and administration

Abatacept is dosed according to bodyweight (eg, less than 60kg = 500mg; 60 to 100kg = 750mg; greater than 100kg = 1000mg). Abatacept is administered as a 30 minute infusion and should be given at two and four weeks following the initial infusion, and at four-weekly intervals thereafter.

### Side effects

The overall incidence of adverse events in clinical trials was similar in both the abatacept and the placebo-treated groups.49 The most commonly reported adverse events included headache, nasopharyngitis, dizziness and nausea. Hypersensitivity reactions (hypotension, dyspnoea, urticaria or wheezing) occurred rarely. Serious infections were noted in up to 3.9% of patients receiving combination therapy with abatacept plus methotrexate versus 2.3% of patients treated with placebo plus methotrexate.49

It is recommended that GPs therefore remain vigilant for signs of infections that are seen more commonly in patients receiving abatacept (in particular pneumonia [abatacept 0.4% to 0.9% v. placebo 0% to 0.5%]).49 Other infections to be aware of in patients being treated with abatacept are cellulitis, urinary tract infections and diverticulitis.

Opportunistic infections and malignant diseases are thought to occur at similar frequencies between patients treated with abatacept and placebo.49 Routine laboratory monitoring for patients receiving abatacept follows the same recommendations outlined for TNF inhibitor therapy: three-monthly monitoring of full blood examination, urea and electrolyte levels, liver function tests and inflammatory markers.

### Rituximab

Rituximab is a genetically-engineered chimeric human/mouse monoclonal anti-body, directed against the CD20 antigen expressed on the surface of mature and premature B-cells.2

B-cells have been shown to play an integral role in the disease pathogenesis of RA. Their pathogenic role is thought to be mediated through either (auto) antibody and/or pro-inflammatory cytokine production, or possibly antigen presentation.4

Rituximab is an effective chemotherapeutic agent in the treatment of CD20 positive B-cell non-Hodgkin’s lymphoma and was initially approved for this indication.40 Recognition of rituximab’s therapeutic potential in RA is a more recent development.42 Treatment with rituximab causes transient depletion of CD20-positive B-cells. This occurs without affecting stem cells or plasma cells, thereby allowing new B-cells to develop after six months.42

In clinical trials for RA, B-cell depletion occurred rapidly, as assessed by CD19 positive cell counts. Response to rituximab was apparent within eight weeks of treatment, with changes in radiographical endpoints showing a trend towards slower progression of joint damage in rituximab-treated patients.44

### Indication

Rituximab is considered a second-line biological DMARD and is indicated in combination with methotrexate for the treatment of adult patients with severe RA. Patients should demonstrate an inadequate treatment response to at least one TNF inhibitor before receiving rituximab therapy.

### Dosing and administration

Rituximab is administered intravenously
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as two doses of 1000mg, given two weeks apart. Rituximab can be administered concomitantly with the dose of methotrexate tolerated by the patient. The timing of retreatment is largely determined by disease activity, but rituximab therapy is generally not repeated until 24 weeks after the first infusion.4

Side effects

Acute infusion reactions (eg, pruritus, rash, urticaria/angioedema, fever, chills, rigors, bronchospasm, with or without alterations in blood pressure) are the most commonly reported adverse events associated with the use of rituximab for RA. Reactions occur most often during (or within 24 hours of) the first infusion, and tend to abate with subsequent doses. The rate of serious infections necessitating intravenous antibiotics per 100 patient-years was 3.7 in the placebo group versus 5.2 for rituximab-treated patients.14 The most common infections reported in both groups were upper respiratory tract infections, nasopharyngitis, urinary tract infections, bronchitis and sinusitis.

GPs should therefore remain vigilant for signs of infections affecting these systems and implement appropriate antimicrobial therapy as needed. There was no suggestion of increased incidence of malignant diseases or opportunistic infections associated with rituximab in clinical trials.4 Routine laboratory monitoring for patients receiving rituximab follows the same recommendations outlined for TNF inhibitor therapy and as stated previously for abatacept.

Development of progressive multifocal leukoencephalopathy (PML), an opportunistic viral infection of the brain, has been associated with the use of rituximab. Patients who develop new or worsening neurological symptoms or signs suggestive of PML require a complete neurological assessment, including a physical examination, an MRI scan and CSF testing for John Cunningham viral DNA. Rituximab must be permanently discontinued if a diagnosis of PML is confirmed.12

Which biological DMARD is most effective?

As more biological DMARDs become available, an important question arises in clinical practice: ‘Which biological DMARD is the most effective agent for treating RA in patients who fail to respond to traditional DMARD therapy?’

To date, no head-to-head comparisons have been performed to answer this question. The final decision on which biological DMARD to use is ultimately influenced by the available evidence and by factors including, but not limited to, an individual patient’s comorbidities and preference.

Emerging therapies

Although a cure for RA remains elusive, the search for new medications and better treatment strategies remains the focus of ongoing research. A large and promising group of emerging therapies involves targeting molecules intrinsic to the intracellular signal transduction pathways involved in the pathogenesis of RA. Therapeutic targets identified within this class of biological agents include the Janus-kinase/signal transducer and activator of transcription (JAK/STAT) pathways, spleen tyrosine kinase (Syk) and the mitogen-activated protein kinases (MAPKs).17

Therapeutic targets

JAK/STAT

JAK binds the cytoplasmic region of transmembrane-cytokine receptors, resulting in STAT activation, which acts as a transcription factor. There are four JAK subtypes, of which JAK3 plays an essential role in signal transduction for IL-2, IL-4, IL-9, IL-15 and IL-21. These interleukin pathways are integral to lymphocyte activation, function and proliferation.

In phase II clinical trials, a new oral JAK3 inhibitor tofacitinib has been reported to bring clinical improvement as early as 12 weeks in measurements of pain, disability and quality of life. Phase III studies have been reported in poster format showing similar efficacy.17,18

### Table

<table>
<thead>
<tr>
<th>Non-TNF inhibitor biological DMARDs</th>
<th>Route of administration</th>
<th>Mechanism of action</th>
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<tbody>
<tr>
<td>Tocilizumab</td>
<td>Monthly IV infusion of 8mg/kg (to maximum of 800mg)</td>
<td>Monoclonal antibody to IL-6 receptor</td>
</tr>
<tr>
<td>Abatacept</td>
<td>Monthly IV infusion dosed according to bodyweight (&lt;60kg = 500mg; 60 to100 kg = 750mg; &gt;100kg: 1000mg), following an initial loading dose given at zero, two and four weeks</td>
<td>CTLA-4–1gG1 fusion protein, an inhibitor of T-cell co-stimulation</td>
</tr>
<tr>
<td>Rituximab</td>
<td>Two 1000mg IV infusions given two weeks apart. Repeat dosing is not usually given for at least six months following the first infusion</td>
<td>Chimeric monoclonal antibody binding to CD-20 on premature B-cells</td>
</tr>
</tbody>
</table>

**Abbreviations:** TNF = tumour necrosis factor; CTLA-4 = cytotoxic T-lymphocyte antigen 4; CD-20 = cluster of differentiation 20; DMARD = disease-modifying antirheumatic drug; IgG1 = immunoglobulin G subclass 1; IL-1 = interleukin 1; IL-6 = interleukin 6; IV = intravenous; SC = subcutaneous
**Syk**
Syk is an important mediator of immunoreceptor signalling in macrophages, neutrophils, mast cells, synovial fibroblasts and B-cells. The net downstream effect of Syk activation includes increased IL-6 and matrix metalloproteinase production. A recently published phase II clinical trial confirmed the positive impact of Syk inhibition on reducing disease activity, and supported the Syk pathway as a potential new drug target for the treatment of RA.19

**MAPKs**
MAPKs are intracellular enzymes that transmit signals to the nucleus, resulting in gene transcription. They have been found in the synovial lining and endothelium of vessels within RA synovium. MAPKs have been implicated in regulating TNF, IL-1 and IL-6 signalling, and animal studies demonstrated their efficacy in reducing joint swelling and damage.16

**New generation monoclonal antibodies**
New generation monoclonal antibodies are also on the horizon for RA treatment. Following the success of rituximab, four new humanised B-cell-depleting therapies are under current evaluation: ocrelizumab, ofatumumab, epratuzumab, and veltuzumab. Research is also under way on developing monoclonal antibodies against novel targets, such as IL-17 (secukinumab) and the haemopoietic regulators, granulocyte colony-stimulating factor and granulocyte-macrophage colony-stimulating factor (mavrilimumab).17

**Conclusion**
Methotrexate remains the drug of choice for the treatment of patients with active RA. There is evidence it is equally efficacious as the biological agents in the treatment of early RA. In patients whose disease is inadequately controlled either with methotrexate treatment or with a combination of other non-biological DMARDs, there is an array of highly effective agents that are now available to treat the disease. The availability of these emerging biological agents has radically changed the approach towards RA management.

The prescription of these new therapies remains in the domain of the specialist rheumatologist (or immunologist with experience in managing RA). However, GPs play a vital role in providing early patient referral for specialist evaluation and partnering with specialists in monitoring patients for the development of treatment- and disease-related complications. The expectation of treatment is now no longer simply to palliate patient symptoms, but to move patients with early RA into long-term remission.

References are available on request.

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**Non-Specific Low Back Pain**

**Continued from page 25**

**Role of surgery**
There is a limited role for surgery in treating patients with low back pain. Decompression surgery may be effective for improving leg pain in patients with spinal stenosis but the value of disectomy, disc replacement and fusion for non-specific low back pain is unclear at best. In all cases, a trial of nonsurgical management before surgical opinion is appropriate. For patients with radiculopathy, although surgery can provide short-term pain relief, long-term outcomes may be comparable to conservative management.

**Prevention of low back pain**
Effective prevention of low back pain is not well understood. This applies to both primary and secondary prevention. There is some evidence to support the influence of increasing physical exercise and improving education levels, specifically the understanding of low back pain as a biopsychosocial condition.39 Education should also promote a shift in beliefs regarding the consequences of low back pain, particularly work absence, fear of physical activity and implications for continuing daily activities.40

**Conclusion**
Low back pain is a prevalent and costly health condition and is the most common musculoskeletal reason for seeking primary care. Serious conditions relating to low back pain present extremely rarely in general practice and investigations for these are recommended only if red flags are present. The prognosis for patients with short-term symptoms of non-specific low back pain is good, and initial management involves advice to maintain physical activity, reassurance and the provision of simple analgesia. If symptoms persist, stronger medication and physical therapies can be recommended. Multi-disciplinary rehabilitation clinics provide an option for patients with severe, disabling symptoms of long duration. Clinicians should avoid providing pathoanatomical labels, and there is no place for routine imaging or pathology tests in patients with non-specific low back pain.

References are available on request.
Whatever the cardiovascular risk number...

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<thead>
<tr>
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...we have an affordable treatment

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<tr>
<td>30 Tablets</td>
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<td>R 120,00</td>
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</table>
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ZA VPAZ 13.04.03
Epilepsy is a disorder of the brain characterised by a predisposition to recurrent seizures together with particular neurobiological, cognitive and psychosocial consequences. Unfortunately, the word ‘seizure’ is used by health professionals to mean different things: for most, it refers to a convulsion, usually epileptic, but for others it refers to a convulsion and also to loss of consciousness from causes other than epilepsy.

Epileptic seizures, either first-ever or break-through, must be clearly differentiated from other paroxysmal events because of the different prognoses and therapeutic approaches. This article discusses the investigation of a patient with a seizure, with a view to confirming the diagnosis, defining the aetiology and assessing the risk for recurrence.

Diagnosis and differential diagnoses

The best way of identifying an epileptic seizure is from a detailed description of the patient’s behaviour during the event. Obtaining a precise history from eyewitnesses soon after the event is paramount. This information becomes increasingly difficult to obtain as time passes.

Epileptic seizures have varied symptoms and many paroxysmal events can be imitators of epileptic attacks. These other causes of transient neurological disturbance and collapse include syncope, hyperventilation, toxic and metabolic disturbances, cardiovascular disorders, sleep disorders, paroxysmal dyskinesias, hemifacial spasms, paroxysmal vertigo, trigeminal neuralgia, migraine, transient global amnesia, psychogenic seizures, episodic dyscontrol and psychiatric dissociative states. It is estimated that 20 to 30% of paroxysmal events are misdiagnosed as epileptic seizures because of an incomplete history or a poor description of events.1

One of the most common misdiagnoses is that of convulsive syncope, where a patient may have body jerks as a consequence of cerebral hypoperfusion during a syncopal attack. The clues in the history and physical examination that distinguish seizures from syncope are outlined in the Table. Although presyncopal symptoms and signs such as light-headedness, fading vision and hearing, sweating and pallor may be useful indicators of an imminent event, they are often not good discriminators of syncope and epilepsy.

Symptomatic seizure, first seizure or epilepsy

Not all patients who have a first seizure have epilepsy. Some of these patients have acute symptomatic seizures that occur at the time of a systemic insult or in close association with a documented brain injury. It is estimated that the incidence of acute symptomatic seizures ranges from 29 to 39 per 100 000 per year, and common causes include traumatic brain injury, cerebrovascular disease, drug withdrawal and metabolic insults.2

Overall, about 40 to 50% of untreated individuals can expect to have a recurrence within two years of an initial seizure.3 Treatment can reduce this risk

Key points

- A detailed eyewitness report of the patient’s behaviour during a seizure can be a valuable ‘diagnostic tool’. The best chance of obtaining this is when the patient presents.

- EEG remains the best diagnostic test for epilepsy but has a low yield unless prolonged studies are performed.

- Structural brain imaging abnormalities may be found on MRI in almost half of adults and up to one-third of children who present with a first seizure.

- Metabolic derangement is the aetiology for a seizure in only a small proportion of patients.
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by up to half. Therefore, success or failure of treatment with anticonvulsants cannot be used to judge whether the diagnosis was correct. Patients with abnormal EEGs or identifiable neurological conditions have greater risks of recurrence.3

Once it is has been established from the history that the event was probably an epileptic seizure, tests are performed to search for an underlying treatable cause and, in the case of a first seizure, to assess the risk of recurrence. The diagnostic evaluation should also aim at determining whether the patient has a generalised or partial epilepsy syndrome. This distinction is important because it will determine the choice of anticonvulsant if treatment is to be initiated.

Investigating patients following a seizure

Electroencephalography

Although the EEG is the most important diagnostic test for epilepsy, it is important to recognise that the detection of epileptiform activity on a routine 20-minute EEG recording in wakefulness ranges from 12 to 27%.4 In addition, 10 to 20% of patients with epilepsy do not demonstrate interictal epileptiform abnormalities, and 2.8% of children and 0.4% of adults have paroxysmal epileptiform discharges in the absence of epileptic seizures.6 Therefore, the interpretation of the interictal EEG requires considerable expertise and correlation with the clinical data. The only way a definitive diagnosis of epilepsy can be made is if a seizure is recorded. Long-term EEG recordings are the most effective way to evaluate epileptic attacks.

The presence of interictal epileptiform activity on the EEG indicates an increased risk of seizure recurrence.7 Despite the heterogeneity of the characteristics of cohorts in first seizure studies, EEG abnormalities and the underlying aetiology are consistently found to be the best predictors for seizure recurrence. An EEG performed when the patient is sleep-deprived may increase the yield of epileptiform changes.8 9

Laboratory tests

Sodium disorders and the resultant effects on osmolality, and hypocalcaemia, hypomagnesaemia and hypoglycaemia are the main metabolic abnormalities that lead to seizures. Seizures generally occur if the serum sodium concentration rapidly decreases to below 115mmol/L. Hypocalcaemia is defined as a serum calcium level of less than 2.13mmol/l or an ionised calcium concentration below 1.0mmol/l. Hypomagnesaemia is defined as a serum magnesium concentration below 0.8mmol/l. Seizures, usually generalised tonic-clonic, can occur in neonates and adults in association with severe hypomagnesaemia, at serum magnesium levels below 0.5mmol/l.9

Routine blood testing (levels of glucose, electrolytes and calcium, and full blood count) is expected to show significant metabolic abnormalities in only a small proportion of patients.10 Additional blood and urine testing should be performed only when clinically indicated (eg, by screening for alcohol or illicit drug

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TABLE

**Distinguishing features of syncope versus epileptic seizures**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Syncope</th>
<th>Epileptic seizure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occurrence</td>
<td>Provocation by prolonged standing, hunger,</td>
<td>In the context of sleep deprivation, drug or alcohol</td>
</tr>
<tr>
<td></td>
<td>heat, pain, micturition, cough, etc</td>
<td>withdrawal, intermittent flashes, etc</td>
</tr>
<tr>
<td>Automatism</td>
<td>No automatism</td>
<td>Oroalimentary automatisms, manual automatisms,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>complex behaviour</td>
</tr>
<tr>
<td>Duration</td>
<td>10 to 30 seconds</td>
<td>1 to 2 minutes</td>
</tr>
<tr>
<td>Symptoms</td>
<td>Flaccidity, with or without brief myoclonus,</td>
<td>Strained cry, tonic-clonic jerks, severe tongue biting,</td>
</tr>
<tr>
<td></td>
<td>opisthotonus (rare)</td>
<td>incontinence, limb posturing</td>
</tr>
<tr>
<td>Postictal phase</td>
<td>Minimal (few seconds)</td>
<td>Several minutes</td>
</tr>
</tbody>
</table>

Figure. Risk of a brain tumour in a patient with a first seizure16
use). The utility of laboratory testing outside the emergency room setting is questionable. The prevalence of metabolic abnormalities has been reported to range from 0 to 15% and rarely to be of clinical significance. However, patients who present with a seizure to an emergency department should have these metabolic tests performed.

**Lumbar puncture**

If there is clinical reason to suspect an infective aetiology then a lumbar puncture might be appropriate. However, only a few studies have explored the utility of lumbar puncture in patients with single unprovoked seizures, and there is no evidence to support routine CSF examinations in patients with such seizures.

**ECG**

When a diagnosis of epilepsy is not definite, a routine ECG is recommended to exclude a long QT interval and to look for other conduction abnormalities that may have led to convulsive syncope.

**Brain imaging**

Despite the improvement in imaging that magnetic resonance offers over CT, the CT scan is the fastest and most widespread brain imaging modality available. Nevertheless, CT has a low sensitivity (4% to 6%) in the absence of abnormal neurological signs. MRI is the best method for structural imaging, being able to detect an abnormality in 47% of adults and up to one-third of children who present with a first seizure. However, it is not available to general practitioners.

It is, therefore, wise to obtain a CT scan in a patient who presents with a first-ever seizure or who has a focal neurological abnormality on examination. If the history in a patient with a first seizure is suggestive of a cerebral lesion and there are focal neurological signs, there is a 31% probability that the patient has a brain tumour (Figure). However, if the history and physical signs are not suggestive of a focal lesion, the chance of a brain tumour is 6 in 1000 (0.6%).

**Conclusions**

EEG remains the best diagnostic test for epilepsy but has a low yield unless prolonged studies are performed. EEG is also important in defining the epilepsy syndrome present, which may have a bearing on the choice of antiepileptic medications.

Structural brain imaging abnormalities may be found on MRI in almost half of adults and up to one-third of children who present with a first seizure. CT has a low sensitivity in comparison but may be useful in patients with focal neurological signs and in the emergency setting. Patients with first seizures who present to the emergency department should have laboratory testing performed and also a drug screen if clinically indicated. Metabolic derangement, however, is the aetiology in only a small proportion of patients with a seizure. A lumbar puncture should only be considered if there is clinical reason to suspect an infectious aetiology.

References are available on request.
Who Should Administer Conscious Sedation?

Part One: What exactly is conscious sedation?

In this three part series we discuss conscious sedation, a relatively young and increasingly popular technique of administering sedatives, analgesics, hypnotics or dissociative agents to induce a state that allows the patient to tolerate unpleasant procedures while maintaining cardiorespiratory function and responsiveness.

From its origins in dentistry it has progressed to emergency departments, day hospitals, doctors rooms and dental surgeries. Some resistance to advanced sedation techniques used outside the operating room by non-anesthetists has been voiced.

Common purposes include:
• Setting fractures, reducing dislocations
• Draining abscesses
• Plastic surgery
• Dermatology
• Endoscopy
• Cardioversion
• Dental procedures
• Trans-oesophageal echocardiogram
• Imaging or minor procedures where the patient is unable (or unwilling) to keep still - especially children

Introduction

To address the very important question raised in the headline we need first to understand what conscious sedation is about and the issues that complicate this question.

It should be emphasised that many professional sedation societies around the world no longer use the term ‘conscious sedation’. In the US the term is often considered an oxymoron or even a myth.

The use of the term conscious sedation is almost exclusively limited to the UK where it defines one of the levels of sedation. Sedation practitioners in SA and the rest of the world prefer ‘moderate sedation’ and ‘analgesia’. They believe moderate sedation and analgesia more accurately describe what sedation practitioners do.

The UK definition of CS includes a requirement that the patient must respond to verbal command at all times during sedation; this is called an ‘appropriate response’. In SA and the rest of the world, mild physical (tactile) stimulation as a way to determine the level of consciousness (LOC) is included in the definition of CS. It is often said that the term conscious sedation is ‘dentistry driven’.

Whatever the term used, the crucial point to understand is that sedation practitioners administer drugs and those drugs may influence the LOC. Those drugs depress the respiratory system and may cause airway obstruction.

• To answer the question of who should administer CS it is important to understand that there are two sedation techniques available to sedation practitioners:
• Simple/basic techniques
• Advanced techniques that involve advanced or combination drugs.

Which drugs fall into each of these techniques and who should administer them are currently areas of controversy: not all sedation practitioners support who should give which drugs.

What is conscious sedation?

“Conscious sedation is a technique in which the use of a drug or drugs produces a state of depression of the central nervous system (and the respiratory system) enabling treatment
The conscious sedation continuum

Responds normally to verbal commands | Responds purposefully to verbal commands / light touch | Responds purposefully to repeated or painful stimuli | No response / Reflex withdrawal

✓ Airway maintained | ? Airway maintained | Airway not maintained

MINIMAL SEDATION

Moderate sedation/analgesia (USA)

Deep sedation/analgesia (USA)

Conscious sedation

Deep sedation

Conscious sedation continuum

Conscious sedation continuum

Procedural sedation and analgesia (PSAA)

Many sedation societies around the world feel that sedation practitioners should use the term Procedural Sedation and Analgesia (PSAA) as a more appropriate and accurate description of what they do when they administer sedative and analgesic drugs. PSAA describes a sedation continuum ranging from light to deep sedation, with the depth of sedation easily titrated by selective administration of sedative and analgesic drugs. The more drugs the sedation practitioner administers, the deeper the level of consciousness will be, with the possibility of unconsciousness, a state not desirable outside the operating theatre.

Conscious sedation continuum

Therefore a continuum exists (see figure) that ranges through the following:

- Minimal sedation or anxiolysis, (a calm, relaxed state/changing the mood of the patient)
- Moderate sedation and analgesia (conscious sedation)
- Profound, deep sedation (an unconscious or hypnotic state called ‘light general anaesthesia’ in the UK)
- General anaesthesia (unconsciousness).

If a sedation practitioner claims he practices PSAA then it can be at any level on the sedation continuum described above.

Built into the concept of a sedation continuum is the fundamental concept of titration. Intravenous drugs for sedation need to be titrated to effect as titration eliminates guesswork and ensure a safe sedation experience.

Non-dissociative and dissociative sedation

The terms ‘non-dissociative sedation’ and ‘dissociative sedation’ are increasingly used today in sedation practice and need further clarification.

The non-dissociative drugs eg, opioids, benzodiazepines, barbiturates, etomidate, propofol, and dexmedetomidine, operate on the sedation continuum. The more of these drugs the sedation practitioner administers, the deeper the patient’s LOC will become, with the possibility of a higher incidence of respiratory depression, adverse events and even unconsciousness. This is where titration of intravenous drugs is so crucial.

Dissociative sedation is produced by the use of ketamine, a N-Methyl-D-aspartate (NMDA) receptor antagonist. A trance-like cataleptic state is induced, characterised by intense analgesia and sedation, amnesia, retention of protective reflexes, spontaneous breathing, and cardiovascular and respiratory stability.
Some sedation practitioners believe that ketamine produces a sedation level which does not operate on the sedation continuum as long as the doses administered are within the PSAA range. They contend that all that is necessary with ketamine administration is to ‘top up’ the dissociative dose when the patient needs more sedation, which is much lower than the anaesthetic dose. Other sedation practitioners disagree. Whatever the opinions, ketamine is a drug increasingly being used for its sedative and analgesic effects in PSAA and in other areas of medicine.

**Sedation techniques**

As mentioned earlier, sedation practitioners acknowledge two sedation techniques:

- Simple/basic sedation techniques
- Advanced techniques that involve advanced or combination drugs.

These give an indication of who should administer conscious sedation.

There is intense debate and currently no consensus on who should be allowed to perform these techniques. The debate is especially between anaesthetists and non-anaesthetists although the guidelines from the SA Society of Anaesthetists are clear about this.

Simple techniques involve the administration of a single drug. These can be performed by operator sedationists (whilst the sedation practitioner performs the operation, monitors the patient, and administers other drugs).

Advanced techniques usually involve combinations of drugs and should be administered only by the dedicated sedation practitioner (who administer drugs and also monitors the patient).

**Simple/basic technique**

The above involves the administration of a single drug ie, a benzodiazepine. A combination of drugs implies an advanced sedation technique.

Some of the drugs applicable to simple/basic sedation are:

- Oral or transmucosal drugs ie, benzodiazepines like midazolam or
- Inhaled combinations of nitrous oxide (N₂O) and oxygen with the concentration of N₂O not exceeding 50% or
- Titrated intravenous midazolam with a maximum of 0.1mg/kg; but never a combination of drugs mentioned.

Simple analgesics ie, paracetamol and the non-steroidal anti-inflammatory drugs do not fall within the definition of simple/basic sedation.

**Advanced technique**

Any of the following sedation techniques would be classified as an advanced technique:

- Infusion techniques: ie, target controlled infusions (TCI) or total intravenous anaesthesia (TIVA)
- Sedation by the intravenous route with any of propofol, ketamine, dexmedetomidine, etomidate and the opiates
- A inhalation anaesthetic agent: ie, sevoflurane
- Any combination of drugs, administered by any route.

**Safety**

It is essential that a wide margin of safety be maintained between conscious sedation and the unconscious state achieved in general anaesthesia, where verbal communication/response to tactile stimulation with the patient, and protective reflexes are lost. It is important that there is a clear understanding by the patient and the sedation team that conscious sedation does not mean the patient will be ‘knocked out’.

With the use of non-dissociative drugs, the key to prevention of deeper levels of sedation and possible sedation complications is the careful titration of the drugs to the desired effect.

**References**

Hypogonadism in Men: How to Evaluate and When to Treat

Low serum testosterone levels are mostly the consequence of concomitant disease and lifestyle factors. Treatment of the underlying disorder is needed, rather than administration of testosterone supplements. In some circumstances, a lowering of testosterone levels may even be an adaptive biological process. Increasingly, men are inappropriately treated with testosterone supplementation rather than having other causative health problems addressed. It is only in a few cases that testosterone therapy might be legitimately considered. This article provides a guide to evaluating suspected hypogonadism or finding of a low serum testosterone level in men and its causes. It also describes the appropriate use of testosterone supplements.

Definition and clinical features of hypogonadism

Male hypogonadism is a clinical syndrome resulting from failure of the testes to produce physiological levels of testosterone, usually in association with abnormal spermatogenesis. The testosterone level below which symptoms occur, variation in the testosterone levels at which particular symptoms occur and whether there is any level associated with adverse health outcomes remain unclear. The abnormality may be at one or more levels of the hypothalamic-pituitary-testicular axis.

In primary hypogonadism, the abnormality is in the testis, and the serum levels of luteinising hormone (LH) and follicle-stimulating hormone (FSH), secreted from the gonadotrophs of the anterior pituitary, are increased. Secondary hypogonadism results from disorders of the hypothalamus and pituitary gland, and LH and FSH levels are inappropriately normal or low.

The causes of primary and secondary hypogonadism are shown in the box. Under some circumstances both situations occur, for example in response to glucocorticoid administration or in patients with haemochromatosis.

Key points

- True hypogonadism is uncommon, but when it is present, testosterone replacement is beneficial.
- With secondary hypogonadism, a correctable or at least modifiable underlying disorder should be considered and treated.
- Similarly, a significant lowering of testosterone levels with advancing age is an indication of the presence of underlying disease.
- Where a significantly low testosterone level persists with a compatible clinical syndrome, supplementation to achieve physiological levels may be warranted, with monitoring for a symptomatic response.
- Induction of supra-therapeutic levels confers no particular clinical benefit.
and, importantly, resolution of symptoms results in an increase in androgen levels to the primary disease process usually in these instances, targeting treatment hypothalamic-pituitary-gonadal axis. Result secondarily in dysfunction of the processes that increase with age and reflects the effect of a range of disease prevalence from the MMaS most likely australi a (unpublished data). The higher overall prevalence of 2.2% has been for men aged 40 to 49 years to 5.1% be 2.1%, increasing with age from 0.1% for more symptoms. More recent data from the European Male Aging Study (EMAS) estimate the overall prevalence of hypogonadism in European men to be 2.1%, increasing with age from 0.1% for men aged 40 to 49 years to 5.1% for those aged 70 to 79 years. A similar overall prevalence of 2.2% has been found in a study of men from Adelaide, Australia (unpublished data). The higher prevalence from the MMAS most likely reflects the effect of a range of disease processes that increase with age and result secondarily in dysfunction of the hypothalamic-pituitary-gonadal axis. In these instances, targeting treatment to the primary disease process usually results in an increase in androgen levels and, importantly, resolution of symptoms.

Diagnosis of testosterone deficiency

The symptoms and signs of testosterone deficiency vary, depending on the age of onset, the severity and duration of the deficiency, comorbid conditions, testosterone sensitivity and previous testosterone therapy. The diagnosis of testosterone deficiency requires the presence of a compatible clinical syndrome and a morning serum testosterone level of 8nmol/L or less on at least two occasions, or up to 11nmol/L when the LH and FSH are elevated by 1.5 times above the upper limit of normal.

The total testosterone level should be measured in the morning after an overnight fast because levels tend to be highest on waking. Low testosterone levels should be confirmed by a repeat measurement on another day. The necessity for repeating measurements of testosterone at a subsequent time is based on data showing that about 30% of men with an initial testosterone level of 11nmol/L had a higher level on repeat testing. In men with an initial testosterone level of 8nmol/L, 20% had an average testosterone level of more than 11nmol/L over six months. When repeat samples were 8nmol/L or less, no man had a testosterone level above 11nmol/L over the subsequent six months. Total testosterone levels reflect both albumin and sex hormone binding globulin (SHBG)-bound testosterone. SHBG, produced in the liver, is regulated by a number of factors (see the box) and variations in levels may be reflected by commensurately higher or lower levels of testosterone in standard total testosterone assays. Therefore SHBG levels, too, must be measured and taken into account when interpreting the results of total testosterone measurements.

Although liquid chromatography tandem mass spectrometry is now considered to be the method with the highest precision for measuring sex steroids for clinical purposes a standard platform assay is quite sufficient. The calculation of free testosterone by equations using assay is quite sufficient. The calculation of free testosterone by equations using the law of mass action does not provide any additional information of clinical relevance. The free androgen index, in which the total testosterone level is divided by the SHBG level, is of no use in men.

Causes of altered sex hormone binding globulin (SHBG) levels

Increased SHBG

• Hyperthyroidism
• Cirrhosis
• Oestrogens
• Increasing age
• Use of anticonvulsants
• Inadequate nutrient intake
• Anorexia nervosa
• HIV infection

Decreased SHBG

• Obesity and insulin resistance
• Impaired glucose tolerance and type 2 diabetes
• Hypothyroidism
• Polycystic ovary syndrome
• Use of glucocorticoids
• Nephrotic syndrome
• Androgens

A thorough evaluation must be made for the causes of hypogonadism, both primary and secondary (see the box), in addition to evaluating general health to exclude systemic illness, eating disorders and abuse of drugs such as alcohol, marijuana and opiates. Any acute illness, nutritional deficiency, stress, depression, obesity (particularly when visceral), type 2 diabetes or a sleep disorder can lower testosterone levels. Heavy alcohol consumption may also reduce testosterone levels. It is important to recognise that cigarette smokers have testosterone levels 5% to 15% higher than nonsmokers, although the reason for this is not entirely clear.

In men with testosterone deficiency, the measurement of LH and FSH levels helps to determine whether the defect resides at the testicular or hypothalamic-pituitary level. A karyotype analysis should be obtained in men with primary testicular failure to exclude Klinefelter’s syndrome (47XXX), which occurs in between one in 500 and one in 1000 men. Men with secondary hypogonadism need additional evaluation, including measurements of prolactin levels, other pituitary hormones, serum iron and transferrin saturation, and an MRI scan, to exclude haemochromatosis,

Causes of hypogonadism

Primary hypogonadism
• Klinefelter’s syndrome
• Disorders of testicular descent
• Cancer chemotherapy
• Radiation therapy to testes
• Infections – eg, mumps, orchitis, HIV infection
• Orchietomy

Secondary hypogonadism
• Pituitary neoplasms
• Radiation therapy to the hypothalamic-pituitary region
• Hyperproclactinaemia
• Haemochromatosis
• Infiltrative disorders
• Idiopathic hypogonadotrophic hypogonadism with or without anosmia
• Genetic disorders of pituitary development
• Eating disorders
• Anabolic steroid use
• Opioid use

Prevalence

Data from the Massachusetts Male Aging Study (MMAS) indicate that in the Boston area of the USA the prevalence of men with symptomatic hypogonadism is about 9% based on a testosterone level of 8nmol/L and the presence of three or more symptoms. More recent data from the European Male Aging Study (EMAS) estimate the overall prevalence of hypogonadism in European men to be 2.1%, increasing with age from 0.1% for men aged 40 to 49 years to 5.1% for those aged 70 to 79 years. A similar overall prevalence of 2.2% has been found in a study of men from Adelaide, Australia (unpublished data). The higher prevalence from the MMAS most likely reflects the effect of a range of disease processes that increase with age and result secondarily in dysfunction of the hypothalamic-pituitary-gonadal axis. In these instances, targeting treatment to the primary disease process usually results in an increase in androgen levels and, importantly, resolution of symptoms.

Causes of altered sex hormone binding globulin (SHBG) levels

Increased SHBG
• Hyperthyroidism
• Cirrhosis
• Oestrogens
• Increasing age
• Use of anticonvulsants
• Inadequate nutrient intake
• Anorexia nervosa
• HIV infection

Decreased SHBG
• Obesity and insulin resistance
• Impaired glucose tolerance and type 2 diabetes
• Hypothyroidism
• Polycystic ovary syndrome
• Use of glucocorticoids
• Nephrotic syndrome
• Androgens
Testosterone therapy

Currently, testosterone therapy is recommended for symptomatic men with classical testosterone deficiency syndromes and low serum testosterone levels who show benefit in terms of induction and/or maintenance of secondary sex characteristics and body composition, improved sexual function, mood and sense of well-being.7 Other indications include short-term adjuvant therapy in men with HIV infection, low testosterone levels or weight loss, and men treated with glucocorticoids or opioids who have low testosterone levels and require supplementation to preserve lean body mass and bone mineral density.8 Contraindications to testosterone supplementation must be excluded in the initial work up (see the box).

Testosterone injections

When testosterone enanthate is administered by intramuscular injection at a dose of 200mg, the patient’s serum testosterone level subsequently rises into the supraphysiological range within 24 to 48 hours, and then gradually declines to the hypogonadal range over the next two weeks.10,11 This produces a ‘surge and wane’ effect that many recipients find unpleasant.

Testosterone undecanoate at a dose of 1000mg is administered as a 4 mL oily suspension, by deep intramuscular injection. It maintains serum testosterone levels in the normal range for 10 to 14 weeks.1 An initial loading dose is followed six weeks later by a further dose and then regular doses are given. The dose interval varies between patients, and in some cases 16 weeks between doses may suffice. Accordingly, monitoring of testosterone levels pre-dose is advisable.

Testosterone implants

In patients treated with testosterone implants, three pellets, each slowly releasing 200mg of testosterone, are implanted deep below the subcutaneous abdominal fat, using a trochar and cannula technique. This provides stable physiological levels for five to six months.

Topical testosterone

Transdermal testosterone gel is available in 56 sachets. It is applied once daily,2 and provides stable and physiological testosterone levels. There is a potential for transfer of testosterone to a sexual partner or to children who come in close contact with the patient. Case reports of precocious puberty in children due to gel transfer have prompted the US Food and Drug Administration to issue a black box warning for this product.

Testosterone patches are applied to the skin of the upper arms and torso. The 24.3mg patch delivers 5mg testosterone over 24 hours continuously and provides stable physiological testosterone levels. A patch half that strength is also available. About one-third of patients using these patches develop significant skin reactions.

Other topical testosterone preparations include a cream, currently in clinical trials to compare its pharmacokinetics with the testosterone gel, and a formulation for application to the axilla.

Oral testosterone

Oral testosterone undecanoate is absorbed preferentially through the lymphatics into the systemic circulation. Doses are typically 40mg to 80mg, given two or three times daily with a fatty meal. The clinical responses are variable and generally suboptimal.7 It may be useful in the very elderly, for the induction of puberty or as a slow introduction of testosterone therapy in men with longstanding deficiency.

Adverse effects of testosterone therapy

Testosterone is generally well tolerated and safe, particularly in otherwise healthy men.8,12 Specific concerns relating to testosterone therapy are described below.

Erythrocytosis

Testosterone therapy increases red cell mass in a dose-dependent manner. The increase in haematocrit levels during testosterone administration is greater in older men,22 men who smoke and those who have obstructive sleep apnoea. Although it had been postulated that testosterone stimulates erythropoiesis through its effects on erythropoietin and stem cell proliferation, it has recently been demonstrated that testosterone increases red cell mass by inhibiting hepcidin, thereby increasing iron availability for erythropoiesis.20

Testosterone supplements should not be administered to men with baseline haematocrit levels of 50% or more without appropriate evaluation and treatment of erythrocytosis. Testosterone therapy should be discontinued when haematocrit levels increase above 54%, and therapy should be withheld until haematocrit levels have fallen to less than 50%, at which time testosterone therapy may be reinitiated at a lower dose.2 Regular venesection can be instituted if necessary.

Cardiovascular events

The long-term effects of testosterone therapy on the risk of cardiovascular events remain unknown. A recent trial reported an increased cardiovascular mortality in frail old men already at high risk for cardiovascular disease who received testosterone therapy.24 The significance of this is uncertain. Until adequately powered trials have been undertaken, testosterone should be used with caution in frail men with significant active cardiac disease.

Prostate cancer

General agreement is that testosterone therapy does not cause prostate cancer.2,25 A meta-analysis of randomised
testosterone trials has reported a higher rate of prostate biopsy and all-cause prostate-related events in the testosterone arms than in the placebo arms. Serum prostate specific antigen (PSA) levels are lower in testosterone-deficient men and are restored to normal after testosterone therapy, but this increase in PSA levels is within normal ranges and generally less than 0.5ng/mL. The major concern in men older than 40 relates to the risk of promoting the growth of pre-existing prostate cancer.

This should be excluded with a PSA test and digital rectal examination before the commencement of testosterone treatment and then at three and six months, followed by annual reviews. A prostate biopsy should be considered if:
- The PSA is more than 4ng/mL
- The PSA increases by 1.4ng/mL at 12 months
- The PSA velocity is 0.4ng/mL/year
- The digital rectal examination reveals any abnormality.

**Benign prostatic hypertrophy**

Testosterone replacement can be administered safely to men with benign prostatic hypertrophy who have mild to moderate lower urinary tract symptoms. A urology evaluation is recommended if there is an increase in lower urinary tract symptoms, for example urgency, frequency, after dribble, difficulty initiating urination or deteriorating stream.

**Monitoring testosterone replacement**

Testosterone therapy should aim to raise testosterone levels into the mid-normal range for young adult men. Total testosterone levels should be measured before each subsequent injection for testosterone undecanoate.

With testosterone undecanoate, the trough level of testosterone should be in the low-normal range, not the mid-normal range, to minimise the risk of erythrocytosis. At three to six months after the initiation of treatment, the patient should be assessed for improvement in sexual function, libido, muscle strength and body composition, as well as mood and overall well-being. In borderline cases, treatment should be discontinued if there is no symptomatic improvement.

Urological, haematocrit and cardiac monitoring are described above. Bone mineral density measurement needs to be repeated only one to two years after treatment if testosterone supplementation was started for low bone mineral density.

**References are available on request.**

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**Food-based Compound Found to Kill Diseased Cells**

A new class of food-based natural compounds, known as phytonutrients, has been found to cause the death of malfunctioning cells, such as cancer cells. The researchers who first discovered this in 1998 have called it “probably the most significant breakthrough in nutrition since the discovery of vitamins.”

The phytonutrient responds to an enzyme called CYP1B1, which is over-expressed in malfunctioning cells and is not present in normal healthy cells. The metabolism of the nutrient by the CYP1B1 enzyme results in metabolites that suppress and cause the death of malfunctioning cells.

The active substance, piceatannol, is known to be highly toxic to cancer cells while being nontoxic to normal cells. These phytonutrients were named ‘salvestrols’ by the cancer researchers who discovered them - Prof Gerry Potter from De Montfort University in Leicester, UK and Prof Dan Burke, a pharmacologist and former Dean of Science at that country’s Sunderland University.

Salvestrols have been identified in parts of fruit, vegetables and herb plants. However, they have a sharp and bitter taste prompting people to remove it before cooking. It also does not survive pesticides.

Salvestrol is distributed in SA by Coyne Consultance. A company spokesperson says a number of SA doctors have worked with this nutrient and have had excellent results.
Large Losses Cloud the Future of Folateng Wards

Questions have been raised about the viability of the Folateng private wards located in four Gauteng public hospitals (Charlotte Maxeke, Helen Joseph, Sebokeng and Pretoria West). Last year, they ran at a loss of about R40m. This came to light in a report adopted in May this year by the Gauteng legislature’s health committee. Provincial spokesperson Simon Zwane admits the health department is reviewing the wards, “with a view to maybe finding a way to make them work better.”

The DA’s Dr Neil Campbell, deputy spokesperson on health for the provincial opposition party, hopes that the private units’ “floors and clean walls become the norm in all public hospitals,” but he also believes “it is time that the expensive Folateng exercise was closed down.”

Established nearly ten years ago to swell the coffers of the public health system through a cross-subsidising process in which private and medical aid patients would pay reasonable rates for treatment in the Folateng wards, the project has been dogged by controversy. A primary goal was to use profit from the private units to benefit state patients through infrastructure development.

Problems with charging, debt collection, and occupancy

In the hospitals, millions have been spent on upgrading equipment so that patients could benefit from cutting-edge technology. The Folateng units offer dedicated care, however, critics point out that low occupancy rates, inadequate debt collection, red tape and undercharging have led to tremendous losses.

Records show bed occupancy in the Folateng wards of 18% at Helen Joseph, 20% at Sebokeng, 35% at Pretoria West, and 76% at Charlotte Maxeke. Neil Campbell claims that “recent visits to the Gauteng Folateng wards have revealed bed occupancy as low as 3% per month, and basic costs per patient as high as R12 750 per day.” In the public wards, the need for beds may exceed 90%.

Charging of Folateng patients is based on the Uniform Patient Fee Schedule and not on usual private rates. This schedule itself has been questioned for not keeping pace with inflation. Other factors, including Folateng’s dependency on the public hospitals for medicines, staff and funding, also seem to play a role in the challenges currently facing these units.

Seeking solutions

The health department is taking the problem seriously, Simon Zwane confirms. “We have undertaken a study of all our Folateng units to identify weaknesses.” The pricing model is under review. “As a public sector, we need to adapt and strengthen the service.”

A statement by the DA’s Jack Bloom underlines the extent of the crisis. “R30m was lost at the 127-bed Folateng unit at the Charlotte Maxeke Hospital, which had R42m revenue but R72m expenses.” He reiterates the view of concerned observers that the department should close these costly private wards.

Clamping Down on Nosocomial Infections in Critically Ill or ICU Patients Now More Affordable

Late last year Pharma Dynamics established a new hospital division which has now introduced its first IV anti-infective, Meroject (injectable meropenem), to the SA market.

According to Brink A, et al, the appropriate uses of meropenem are:

• Early treatment of severe nosocomial infections in the critically ill or ICU
• Empirical therapy based on local surveillance data
• May be suitable against Gram-negative organisms where first-line treatment has failed
• May be necessary in certain conditions with chronic multiresistant pseudomonal infections
• May be considered for neutropenic sepsis and severe abdominal sepsis

• Recommended for use in meningitis

Indications for Meroject also include pneumonia, UTI and septicaemia in adults and children.

Pharma Dynamics says it is the leading supplier of cardiovascular medicine in SA.

Meroject is available in two strengths at substantial cost savings vs the originator:

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<th>Product</th>
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<th>Price (SEP excl VAT)</th>
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<tr>
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<td>20ml glass vial</td>
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<tr>
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References on request
Among US GPs Electronic Health Records Usage Soars – Research

More than two-thirds of US family practitioners (GPs) had adopted electronic health records (EHRs) by 2011, and the adoption rate is likely to surpass 80% this year, according to a new study in the Annals of Family Medicine.

The data came from the American Board of Family Medicine (ABFM), which surveys all candidates applying for its maintenance of certification exam, and the National Ambulatory Medical Care Survey (NAMCS). The results of the two surveys showed EHR adoption among family doctors doubled to 68% between 2005 and 2011. Lead author was Dr Imam M. Xierali, PhD, of the Association of American Medical Colleges and Georgetown University, Washington, DC.

"Electronic health records are generally expected to improve the quality of health care, lower health care costs, and provide patients with more involvement in their own health care," wrote Dr Xierali. "However, the realisation of EHR benefits depends heavily on health providers' uptake of this technology." The purpose of the study was to monitor this.

Interestingly, rural areas did not have significantly lower adoption rates than urban areas, Dr Andrew Bazemore, director of the Robert Graham Center of the American Academy of Family Physicians (AAFP), said. However, he added, there was somewhat lower adoption in areas with high rates of poverty.

Family doctors outstrip other specialties

The study found: "EHR adoption by family doctors has steadily risen reaching approximately 67% in 2011. Data indicated that the EHR adoption rate by family doctors has more than doubled from 2005 to 2011. It could surpass an 80% threshold nationally by 2013 based on the current trend.

Adoption by family doctors exceeds that of other office-based doctors as a group, confirming what many have reported - that primary care doctor adoption rate is higher than that of other specialists."

Bazemore suggested several reasons for this disparity. First, the AAFP has since 2004 emphasised the importance of health IT in rebuilding family medicine. "It was the centre of what we thought we needed to do to transform ourselves, even five or ten years ago."

In addition, he noted, the AAFP has been driving that message home to members for the past decade. No other specialty society has been at it for that long, he stated.

EHRs most helpful in family practice

One reason is the nature of family medicine, he added. "Family doctors had a lot of good reasons to walk toward EHRs earlier, based on the nature of their practice, its breadth and the way they approach medicine."

Bazemore admitted that the study did not provide any insight into what kind of EHRs family physicians were using or what they were using them for. The question asked on both the NAMCS and ABFM surveys, he said, was blunt. "It just asked, 'Do you use an EHR in your office?' That ranges from the simplest practice management software or registry to something that's infinitely more complex."

Incentives drove adoption

The NAMCS survey, however, found that in 2011, about a third of doctors had an EHR that met the US government's criteria for a "basic system". This is a system that includes most of the capabilities required for what the government calls 'meaningful use'.

Up to the end of 2012, about 20 000 family doctors had received government incentive payments, meaning they had attested to meaningful use. Some other GPs had received incentives for which they didn't have to attest to meaningful use in the first year.

The researchers estimated that EHR adoption among GPs would hit 80% this year, based on extrapolation of the trend line from 2005-2011, Bazemore noted. The EHR adoption rate might drop after that, he said, because not all of the laggards will implement systems. However, he added, penalties for not showing meaningful use by 2015 would probably encourage most doctors to adopt by then.

Exciting potential

Moreover, he pointed out, the new forms of care delivery that are emerging assume that doctors have EHRs. "So you could be penalised by a loss of business if you don't adopt."

Looking ahead the study concluded: "Now that EHRs are common, important research is both increasingly plausible and essential to determine how EHRs can improve health care and population health and help contain costs."
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Modern Medicine’s CPD Journal Programme
Answer Form

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INSTRUCTIONS
1. Use a blue or black pen only.
2. Fill in the appropriate circle completely, i.e., do not use X or ✓ or any other mark.
3. Erase or white out mistakes fully.
4. Answer all the questions.
5. Each group earns 1 CPD point.

Month of issue
JUNE 2013
Please return by September 30, 2013

Fill in the answers from the question page to the block below.

ECG Of The Month
1 T F 1 T F 1 T F 1 T F
2 T F 2 T F 2 T F 2 T F
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Non-Specific Low Back Pain
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Rheumatoid Arthritis (RA) & Biological Therapies
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Conscious Sedation
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Hypo gonadism in Men
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Circumcision; Ethical and Legal Aspects
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4 T F
5 T F

Once completed . . .
• Make an accurate and clear photocopy of this answer form for your records.
• Cut this CPD answer form out of the journal carefully, place in a stamped, addressed envelope, and post it to Modern Medicine, PO Box 84622, Greenside 2034, South Africa (Do not register the letter) - OR Scan the completed answer form and email it to CPD@modernmedia.co.za
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I declare that these are my own answers, and I would like to continue receiving Modern Medicine.

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QUESTIONS FOR CPD ARTICLES: JUNE 2013
CPD: 5 Regular points; 2 Ethics points

Instructions
1. The answer form is bound into this journal opposite.
2. Read the instructions on the answer form and answer the questions carefully.
3. Your answers for the June 2013 issue must reach Modern Medicine, PO Box 84622, Greenside 2034 by September 30, 2013.
4. You must score at least 80% in a section to be awarded the assigned CPD point for it.
5. Modern Medicine will keep track of all CPD points earned and will issue a single, comprehensive certificate to all participants at year-end.

Answer the following questions as either true or false. All the answers are to be found in the CPD articles in this issue.

ECG CHALLENGE (Pg 15)
1. DC cardioversion should not be attempted until there is more certainty regarding the etiology of the wide complex tachycardia.
2. Supraventricular tachycardia (SVT) with bundle branch block (aberrant conduction) is a more common cause of wide ventricular tachycardia (VT).
3. A diagnosis of VT cannot be made when there is one QRS complex for every P wave (no AV dissociation).
4. A broad complex tachycardia that converts to sinus rhythm after the administration of adenosine cannot be a VT.
5. Wide, negatively concordant QRS complexes (all complexes are predominantly negative) in V1-V6 are virtually diagnostic of VT.

NON-SPECIFIC LOW BACK PAIN (Pg 19)
1. Urinary retention is common in non-specific low back pain.
2. Pseudoclaudication is a feature of spinal stenosis.
3. Patients with non-specific low back pain should rest until the pain subsides.
4. Back pain responds well to lumbar support and massage.
5. Imaging should be reserved for patients where serious spinal pathology is suspected.

RHEUMATOID ARTHRITIS (RA) & BIOLOGICAL THERAPIES (Pg 31)
1. Methotrexate is the disease-modifying anti-rheumatic drug (DMARD) of choice in RA.
2. Tocilizumab is a monoclonal antibody that binds to IL-6 receptors.
3. Tocilizumab may raise cholesterol levels to the extent that statins need to be prescribed.
4. Serious infections may complicate both abatacept and rituximab administration.
5. The GP should be the health care practitioner to initiate biological DMARD therapy.

CONSCIOUS SEDATION (Pg 44)
1. PSAA means conscious sedation.
2. Advanced sedation techniques mean that the sedation practitioner can only give one drug.
3. All intravenous drugs for sedation must be titrated to effect.
4. Nitrous oxide inhalation of more than 50% is an advanced conscious sedation technique.
5. Using propofol for sedation is a simple/basic technique.

HYPOGONADISM IN MEN (Pg 47)
1. Both smoking and excessive alcohol consumption are associated with a reduction of serum testosterone.
2. Increased serum levels of LH and FSH suggest primary testosterone deficiency.
3. Testosterone often increases the haematocrit in the elderly.
4. Testosterone is an important cause for prostatic malignancy.
5. Testosterone may promote the progression of pre-existing prostatic cancer.

CIRCUMCISION; ETHICAL AND LEGAL ASPECTS (Pg 12)
1. The USA and UK have similar rates of Routine Neonatal Circumcision.
2. Routine Neonatal Circumcision is prohibited under South African Law.
3. Under trial conditions, circumcision of adults reduced HIV by 38-66%.
4. Traditional circumcision appears to offer similar rates of reduction.
5. The author favours RNC for the prevention of HIV infection in males.

See answer form opposite

MARCH WINNER: CONGRATULATIONS TO DR EM DE VILLIERS OF GREENPOINT WHO WINS THE OTC PHARMA HAMPER!
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<td>22 - 26 Jul</td>
<td>CDE - Centre for Diabetes and Endocrinology: 5-Day Advanced Course in Diabetes Care</td>
<td>WHERE: 81 Central Street, Houghton, JOHANNESBURG CONTACT: Centre of Diabetes and Endocrinology • 011-712-6000 • <a href="mailto:john@cdecentre.co.za">john@cdecentre.co.za</a> or <a href="mailto:michael@cdecentre.co.za">michael@cdecentre.co.za</a> CPD (30), EXHIBITION, 50-100 Speakers <a href="http://www.cdecentr.co.za">www.cdecentr.co.za</a></td>
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<td>26 - 28 Jul</td>
<td>2nd Update in the Management of Patients with Vestibular Disorders</td>
<td>WHERE: Indaba Hotel, JOHANNESBURG CONTACT: Tessa Booyens • 012-420-5015 • <a href="mailto:tesssa_ce@up.ac.za">tesssa_ce@up.ac.za</a> CPD (22), EXHIBITION, 10-50 Speakers <a href="http://www.audiologysa.co.za">www.audiologysa.co.za</a></td>
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<td>25th SA Transplantation Congress</td>
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<td>1 - 4 Aug</td>
<td>Cardiothoracic Conference</td>
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<td>14 - 17 Aug</td>
<td>19th International Symposium on Dental Hygiene</td>
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<td>18 - 21 Aug</td>
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<td>22 - 25 Aug</td>
<td>RSSA/SORS - Radiological Society / Society of Radiographers</td>
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<td>SASCRO/SASMO - 16th National Society of Clinical and Radiation Oncology and Society of Medical Oncology Congress</td>
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<td>SASCRO/SASMO - 16th National Society of Clinical and Radiation Oncology and Society of Medical Oncology Congress</td>
<td>WHERE: Champagne Sports Resort, DRAKENSBURG CONTACT: R K Communication • 051-436-7733 • <a href="mailto:rkc@telkomza.net">rkc@telkomza.net</a> CPD, EXHIBITION, 10-50 Speakers <a href="http://www.sascongress2013.co.za">www.sascongress2013.co.za</a></td>
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<td>28 Aug - 1 Sep</td>
<td>SASOP - Biological Psychiatry Congress</td>
<td>WHERE: Wild Coast Sun, SOUTH CAPE CONTACT: Sonja du Plessis / Stacey Coetze • 011-768-4355 • <a href="mailto:sonja@londocor.co.za">sonja@londocor.co.za</a> • <a href="mailto:stacey@londocor.co.za">stacey@londocor.co.za</a> CPD, EXHIBITION, 10-50 Speakers <a href="http://www.sasop.co.za">www.sasop.co.za</a></td>
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