Aster Medical Journal

Lead Article
Robotic Surgery

Common Clinical Problems
Back pain

Short Review
Acute Febrile illness

Case Reports
Hybrid Aneurysm Repair
Chiari O Malformation

Images in Medicine
Bunny Rabbit sign

Perspective on guidelines
Venous Thromboembolism

Commentary
Reducing childhood mortality

Quality in Healthcare

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Message from the Patron

I have always firmly believed that in the race towards excellence, there is no finishing line. Aster Medcity was born out of a passion to create a unique, one-of-its-kind medical destination in South Asia where the finest doctors and the most advanced technology from across the world come together to make a difference to the community, the country and the world.

The Aster Medical Journal will be our voice that periodically reaches out to the medical fraternity worldwide. I am certain that the Editorial team will take utmost care to ensure the highest possible standards in the choice of the content that is featured here. This journal should evolve into being the custodian of the health indices of Kerala in the national as well as international context.

Our rapidly expanding network across eight countries will ensure that we have contributions from across geographies. Nurtured the right way, the Aster Medical Journal should evolve into a platform where the best scientists worldwide want to publish.

I hope every issue of this Journal will be like a window that lets new light in; like a catalyst that triggers new thought and action; like a vehicle that drives science towards better health and a better life.

Dr. Azad Moopen
Chairman
Aster DM Healthcare Pvt. Ltd.
Message from the Publisher

As we open our doors to the world on the 12th of August 2014, the vision of Dr. Azad Moopen and Aster DM Healthcare will start unfolding – the creation of a medical environment that will constantly woo the best talent and technology in a conscious attempt to be the leading healthcare destination in South Asia.

I am certain that the Aster Medical Journal will live up not only to the high, exacting standards we set for ourselves, but also evolve into a publication that is respected in India and abroad. I congratulate the Chief Editor and the entire Editorial Board on this momentous occasion.

Dr. Harish Pillai
Chief Executive Officer
Aster Medcity
Editorial

“Learning never exhausts the mind” Leonardo Da Vinci

We never stop learning in medicine. Every new patient teaches us something different. Many a study that is published changes our perspective of treatment strategies. Aster Medical Journal is being launched with the aim of continuing the learning process of the physicians and providing a platform for them to share their clinical and academic experiences as well. The Editorial board will ensure that the contents of the journal are clinically relevant and that the knowledge gained will promote the practice of Evidence Based Medicine and Guideline Directed Medical Therapy. At the same time, the Journal will bring out the nuances of the newer and evolving technologies in the medical field. Each issue will also have a perspective on recently published clinical guidelines.

The inaugural issue of the Journal has Robotic surgery as the lead article. With automation and robotics already playing a role in modern life, it is natural that medical science also embraced this technology. Dr Kishore has expanded on the use of Robotics in clinical practice. A common clinical problem—back pain, has been chosen for in-depth discussion. Back pain has been a price to pay for the erect posture adopted by Homo sapiens. This has been aggravated by wrong adoption of posture. Preventive strategies and therapeutic options have been discussed in this issue.

Case reports often highlight the "odd man out" syndromes or an "out of the box" management of diseases. This issue of the Journal presents Hybrid management of Aortic aneurysm, a novel technique that combines surgical and interventional skills to the benefit of the patient.

Prevention of venous thromboembolism is an often neglected component of care in many parts of the world. Dr Mathew has attempted to put into perspective the current guidelines for prevention of thromboembolism and its application in current clinical practice. This is expected to trigger a change in mindset across all specialities.

From a country wide perspective, Professor Kurien Thomas, a national consultant on disease surveillance, was invited to give a commentary on the possibility of early initiation of pneumococcal vaccine reducing childhood mortality in India.

Finally, Quality in healthcare is the buzzword in the medical field today. Standards have to be adhered to and health care outcomes audited. This is amply made evident in the article by Ms. Gracy Mathai.

I would like to thank all the members of the Editorial Board for their guidance. All efforts are being made to make this new Journal a useful addition to the world of medical literature. I look forward to all your suggestions, as we embark on this academic journey.

DR. ANIL KUMAR R
The dawn of computer age has stimulated modern medicine to evolve at a rapid pace in the last few decades. The diagnostic and treatment modalities which were a distant dream few decades ago have become a reality now. The advent of endoscopic and video assisted surgical techniques have revolutionised the practise of surgery by minimising the size of incisions. However, due to the limitation of the instruments available, endoscopic techniques had been restricted primarily to excisional procedures. Robotics made its first appearance in surgery 25 years ago for a neurosurgical biopsy and has since then captivated the imagination of clinicians as a possible solution to various clinical problems. A variety of surgical robots have been developed to address a plethora of issues across an entire gamut of clinical specialities. The principle behind surgical robotics is that a computer provides a digital interface between the surgeon's hands and the surgical instruments, improving the surgeon's dexterity and transcending his natural physical limitations. This allows the surgeon to perform more intricate endoscopic surgical procedures.

History of Surgical Robotics
Aristotle is credited with the original concept of automation. In the fourth century BC, he wrote, "if every instrument could accomplish its own work, obeying or anticipating the will of others, then the chief workmen would not need servants." Although the concept is centuries old, the term robot first was coined in 1920. It is a derivative of the Czech word robota, and is attributed to the playwright Karel Capek in his play, "Rossum's Universal Robots." The play was a parody on utopian society in which all menial labor was performed by machines thereby liberating man to enjoy a life of leisure. Interestingly, the term robotics did not come into use until 1942 when Isaac Asimov published the story "Runaround" in the magazine Astounding. It was in this manuscript that Asimov’s Three Laws of Robotics were expounded. These laws are: 1) robots may not injure a human being, or, through inaction, allow a human to come to harm; 2) a robot must obey the orders given to it by human beings except by such orders that would conflict with the first law; and 3) a robot must protect its own existence as long as such protection does not conflict with the first or second laws. These thoughts and writings have been translated into working models over the last 200 years and are still applicable today to surgically relevant robots. The combination of computerized robotics and surgery has opened the doors to an exciting area in the field of medicine.

The first application of robotics was in 1985, when a stereotactic biopsy system called Neuromate (Integrated Surgical Systems, Davis, CA) was introduced in neurosurgery. Wickham et al from Imperial College London adapted a novel robot named 'Probot' for Transurethral resection of prostate. Barger et al and Cobb et al developed Robotic systems for hip replacement (Robodoc) and total knee replacement (Acrobot). However AESOP (Computer Motion, Sunnyvale, CA) was the first surgical robot to receive FDA approval, in 1993. In 1995, development began of a new robot that was based on three AESOP arms, one for the camera and two for surgical instruments. This system was called ZEUS and was a master-servant system that offered motion scaling and tremor reduction for laparoscopic and other minimally invasive surgeries. Highlights of ZEUS
include the first robotically assisted CABG in 1998, and the first transatlantic telerobotic surgery (cholecystectomy by Jacques Marescaux in 2001). Around this time, ZEUS received limited FDA approval for abdominal procedures.

Frederic Moll and colleagues formed Intuitive Surgical in 1995 based on technology developed by the Stanford Research Institute and developed the Da Vinci Robot. This system consists of a surgeon's console, computer controller, and endoscopic instruments with articulated “endowrist” at the ends of surgical arms. Carpentier et al in Paris performed a mitral valve procedure with the Da Vinci system in 1998. In the same year Mohr and colleagues performed the first robotically assisted coronary artery bypass graft procedure (CABG). After a 200 patient randomized clinical trial to test safety and efficacy in cholecystectomy and Nissen fundoplication, the Da Vinci robot received FDA approval in July 2000. The initial clinical applications for the robot were in cardiac surgery, but the Da Vinci system gained significantly greater popularity in other subspecialties such as urology and gynecology. Intuitive Surgical acquired Computer Motion in 2003 and since then, the AESOP and ZEUS systems have been discontinued.

The Da Vinci robotic system: overview, advantages and limitations

There are 4 major components in current surgical robotic systems: the surgical interface device, the computer controller, the robotic arm/instruments, and the visualization system. The surgeon is seated at the interface device where he controls the instrument handles. His movements are relayed to and digitized by a computer controller. The information is then passed to robotic arms, which are positioned on or near the operating table.

The Da Vinci robotic arm systems are able to move with multiple degrees of freedom, simulating the movement of the human arm, elbow, and wrist. Two additional robotic arms are present, one holds and manipulates the endoscope, and the other helps in retraction of organs. All the arms are controlled by the surgeon. The direct control of the multiple robotic arms can eliminate the need for a human assistant. The robotic camera arm has been shown to be more precisely controlled than a by a human assistant and the number of times the camera needs cleaning has been reduced 3- to 5-fold (Table 1).

The endoscope allows for much greater magnification than traditional surgical loupes, enhancing the surgeon's visualization of small structures. To overcome the loss of depth perception due to 2-dimensional video monitors, a traditional drawback in endoscopic visualization, Da Vinci offer high-resolution 3-dimensional monitors (Table 1).

The computer interface is the major difference between robotic and traditional surgery. It allows for digitization of the surgeon's movements. The two salient features of digitization are tremor filtering and motion scaling. The surgeon's movements
The instrumentation available with computer-assisted endoscopic surgery offers significant advantages over conventional handheld instruments. Movements of conventional non-robotic laparoscopic instruments are limited to 4 degrees of freedom. Furthermore, the operator's motions are counterintuitive (i.e., the tip and handle move in opposite directions) and shear forces on the laparoscopic instruments are high, leading to increased operator fatigue. These inadequacies are due to a phenomenon known as the "fulcrum effect."17,18 With the help of the computer controller, intuitive motion is restored such that when the surgeon moves the instrument handle one way, the instrument tip moves in the same direction. Thus robotic systems allow for more intuitive hand movements by maintaining both the natural eye-hand axis as well as the oculovestibular orientation. This is in sharp contrast to the mirror image movements required in conventional endoscopic surgery. Robotic systems also allow for seven degrees of freedom in movement by including a "wrist" joint on the instrument, creating a more natural hand-like articulation.17,18

The video monitor may be situated from the hand controls at the surgical interface device are digitized. Data in digital form can be manipulated to enhance dexterity. When using long instruments, the effect of tremor at the hand is amplified at the instrument tip. By filtering out high-frequency oscillating motion, the computer controller can remove the surgeon's innate tremor that is transmitted to the instrument tip. This elimination of tremor enhances precision and may even facilitate ambidexterity. The computer controller also permits a variable degree of motion scaling, anywhere from 1 to 10 fold, changing gross hand movements at the console to fine movements in the operative field. For example, when the robotic system is set to scale motion at 10 to 1, it translates a 10-mm motion at the hand controls of the surgical interface into a 1-mm motion at the instrument tips.17,18

As with most robotics systems there are drawbacks for the Da Vinci robot too. Lack of tactile feedback from the instruments is one of the major inadequacies of the current Da Vinci system. Cost is a limiting factor, especially from the perspective of a developing country like India. Start-up capital expenses for surgical robotics are high ($1-1.3 million per Da Vinci robot, $100,000/yr maintenance, approximately $2000/ instrument). Though savings on surgical expenses from robotic assisted surgery have yet to be systematically gauged, direct cost savings have been demonstrated from lessened blood loss and morbidity, which results in decreased length of hospital stay. Additional indirect savings resulting from improved operative field visibility, enhanced surgical dexterity, and standardization of microsuturing may help offset the high capital expenses. With increasing availability and decreased cost, robotically assisted surgery may ultimately expand the surgical pool that can tackle many complex procedures currently restricted to only those that have mastered advanced techniques.

Robotic application in various specialities
Urology has become the leading specialty driving the growth of surgical robotics. In 2013, 80% of the robotic prostatectomies in United States were performed using the Da Vinci system. Other urological procedures frequently performed robotically include cystectomies, pyeloplasties, and partial nephrectomies. Trials to date strongly suggest fewer major complications, less EBL, decreased blood transfusions, and improved margins of resection with robotics than with open procedures.19-22 The Da Vinci system is gaining wider usage in the field of gynaecology

Table 1: Comparison of Salient Features of Robot Assisted laparoscopy and Pure Laparoscopy

<table>
<thead>
<tr>
<th>Robot Assisted Laparoscopy</th>
<th>Pure laparoscopy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intuitive</td>
<td>Counterintuitive</td>
</tr>
<tr>
<td>Tremor Filtered</td>
<td>Tremor pronounced</td>
</tr>
<tr>
<td>Immersive Three dimensional view</td>
<td>Two Dimensional view</td>
</tr>
<tr>
<td>Surgeons controls the camera</td>
<td>Requires an assistant</td>
</tr>
<tr>
<td>Seven degrees of freedom</td>
<td>Four degrees of Freedom</td>
</tr>
</tbody>
</table>

From the hand controls at the surgical interface device are digitized. Data in digital form can be manipulated to enhance dexterity. When using long instruments, the effect of tremor at the hand is amplified at the instrument tip. By filtering out high-frequency oscillating motion, the computer controller can remove the surgeon's innate tremor that is transmitted to the instrument tip. This elimination of tremor enhances precision and may even facilitate ambidexterity. The computer controller also permits a variable degree of motion scaling, anywhere from 1 to 10 fold, changing gross hand movements at the console to fine movements in the operative field. For example, when the robotic system is set to scale motion at 10 to 1, it translates a 10-mm motion at the hand controls of the surgical interface into a 1-mm motion at the instrument tips.17,18
for hysterectomies (for benign and malignant disease), myomectomies, and sacrocolpopexy.\textsuperscript{27} Maeso and colleagues published a meta-analysis of the literature comparing the use of the Da Vinci system with laparoscopic techniques in the case of fundoplication, Heller myotomy, gastric bypass, gastric banding, gastrectomy, cholecystectomy, splenectomy, colectomy, and rectopexy.\textsuperscript{28} Wilson published a review of many of the same procedures and also looked at thyroidectomy, pancreatectomy, and adrenalectomy.\textsuperscript{29} Low anterior resections are a newer application being explored with the Da Vinci system.\textsuperscript{29} Weinstein et al and his colleagues developed, conducted technical and feasibility trials, and performed early clinical, studies using the Da Vinci system for transoral procedures (transoral robotic surgery [TORS]).\textsuperscript{29} The use of the Da Vinci Surgical System has been explored for use in thoracic surgery procedures, such as lobectomies, mediastinal mass resections, and esophageal procedures.\textsuperscript{31,32} Chitwood et al, have have created and used in vivo microrobots with platform. Researchers at the University of Nebraska and congruent heart disease.33

References:


Posture and back pain

Bibi Dhanan, Vijayamohan, Subin Sugath, Vinod Kumar,
Aster Orthopaedics, Aster Medcity, Kochi

Abstract

Background:
Back pain is a common musculoskeletal disorder that often occurs in the working age population. Although numerous risk factors have been implicated in its etiology, determining causation remains challenging and requires a methodologically rigorous approach.

Purpose:
To conduct a systematic review focused on establishing a causal relationship between posture and back pain; to propose remedial measures if there are any.

Methodology:
A systematic review using PubMed was performed to identify, evaluate, and summarize the literature related to establishing a causal relationship, according to a quality criteria, between posture and back pain. Posture, back pain and Low Back Pain (LBP) were used as key words. Studies in 2013 and 2014 (till date) were included in the search.

Results:
This search yielded 220 citations. Twenty two high quality studies reported about posture and back pain. There were one review, fourteen case control studies (six randomised control trials and one prospective cohort study) and one review. All the papers considered fixed postures and prolonged sitting as a causative factor for back pain. Some of the references of the recent studies were also analysed. These reported that sitting, in combination with an awkward posture and/or whole body vibration increases the chances for back pain. Increased intradiscal pressure while awkward sitting, low level, prolonged static contractions of back muscles could lead to an increased risk of injury. The increased abdominal muscle activity in back pain developers also predispose them to pain development. Dynamic seating is proposed as a remedy for prevention. However there is literature for and against this. Physical activity, Back care education and breaks in between sitting goes a long way in preventing back pain.

Conclusion:
Fixed posture and prolonged sitting are risk factors for back pain. Dynamic seating, back support, physical activity and back care education helps in prevention of back pain due to postural abnormalities.

Keywords
Posture, Backpain, Low Back Pain.

Introduction:
Back pain has been identified, worldwide, as one of the most costly disorders among the working population. In the past decades, epidemiological studies have contributed to our understanding of the etiology of low back pain. Posture has been associated with risk of developing back pain. The purpose of this literature review is to assemble and describe evidence of research on the association between posture and back pain. Posture, back pain and Low Back Pain (LBP) were used as key words. Studies in 2013 and 2014 (till date) were included in the search.

Laboratory studies have focused on biomechanical hypothesis to explain the association between sitting and LBP. The literature on this subject is extensive, but the evidence is somewhat contradictory. It has been shown that intradiscal pressure is increased in the sitting posture. In a more recent investigation Wilke et al re-evaluated the intradiscal pressure in sitting and found that, in fact, it can be lower in sitting than in standing. Another hypothesis is that prolonged static sitting postures may have a negative effect on the nutrition of the intervertebral disc. Thus a constantly changing position may promote the flow of fluid (nutrition) to the disc.

The purpose of this paper is to review the more recent literature that examines the association between posture and back pain. Understanding the risk factors for back pain may lead to prevention programs. The following questions were considered:

1. Is there evidence in recent epidemiological literature for an association between posture and back pain with special reference to sitting and awkward posture?
2. What are the preventive or remedial measures...
suggested for posture induced back pain if posture is a cause?

Methodology
Using PubMed search, studies in 2013 and June 2014 were retrieved. The primary keywords used were Posture, Back pain and LBP. Reference lists of studies retrieved were carefully screened in order to locate additional papers. Articles written only in English were included and a total of 220 studies were identified. Quality criteria were established for inclusion and carefully analysed by the authors. The criteria were: a clear definition of back pain and or posture; a control group (if applicable) that is well described and relevant (consisting of similar or internal groups subjected to less exposure to sitting); a response rate reported if a questionnaire was used to gather data; exposure described or at least graded; and a statistical measure of association (OR or Risk Ratio).

Results
Twenty two high quality studies reported about posture and back pain. There were one review fourteen case control studies (six were randomised control trials and one prospective cohort study) and one review at the time of this publication. All the papers considered fixed postures and prolonged sitting as a causative factor for back pain. Some of the references of the recent studies, which reported sitting in combination with awkward posture with or without whole body vibration increasing the risk for back pain, were also analysed. Increased intradiscal pressure while awkward sitting; low level, prolonged static contractions of back muscles could lead to an increased risk of injury; and the increased abdominal muscle activity in back pain developers also predispose them to pain development.

Dynamic seating is proposed as a remedy for prevention. However there is literature for and against.21,23 Physical activity, Back care education and breaks in between sitting goes a long way in preventing back pain. Exercise based posture correction programmes in schools has shown beneficial effects in children and young adults.

Discussion
History of low back pain often begins in childhood or adulthood. Indeed the prevalence of severe back symptoms among school children is significant. Several life style factors have been reported as significant risk factors for back pain in children.

Table 1. Association between presence of back pain (BP) and posture

<table>
<thead>
<tr>
<th>Study</th>
<th>Study design</th>
<th>Study population</th>
<th>Outcome</th>
<th>Exposure</th>
<th>OR/risk indicator/ significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggarwal et al (1)</td>
<td>RCT</td>
<td>N=160</td>
<td>LBP</td>
<td>Body posture</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Albert WJ et al (2)</td>
<td>Case control study</td>
<td>N=15</td>
<td>Neck pain</td>
<td>Prolonged sitting</td>
<td>75% OR=103</td>
</tr>
<tr>
<td>Baker et al(3)</td>
<td>RCT</td>
<td>N=74</td>
<td>BP</td>
<td>posture</td>
<td>P = 0.01</td>
</tr>
<tr>
<td>Coenen P et al (4)</td>
<td>RCT</td>
<td>N=1745</td>
<td>LBP</td>
<td>posture</td>
<td>OR=2.06(1.32-3.20)</td>
</tr>
<tr>
<td>Estrich C (5)</td>
<td>Case control study</td>
<td>N=965</td>
<td>BP</td>
<td>posture</td>
<td>P = 0.02</td>
</tr>
<tr>
<td>Grondin et al (6)</td>
<td>Case control study</td>
<td>N=28</td>
<td>LBP</td>
<td>Lumbar support</td>
<td>P=0.017</td>
</tr>
<tr>
<td>Karunanayake AL et al (9)</td>
<td>Case control study</td>
<td>N=166</td>
<td>LBP</td>
<td>Posture</td>
<td>OR= 107.4</td>
</tr>
<tr>
<td>Lane JR (10)</td>
<td>Case control study</td>
<td>N=500</td>
<td>BP</td>
<td>Posture</td>
<td>OR=33.2</td>
</tr>
<tr>
<td>Latalski M et al (11)</td>
<td>Case control study</td>
<td>N=380</td>
<td>BP</td>
<td>Posture</td>
<td>OR=74.2</td>
</tr>
<tr>
<td>Lazary A et al (12)</td>
<td>review</td>
<td></td>
<td>BP</td>
<td>posture</td>
<td>significant</td>
</tr>
<tr>
<td>Morl et al (17)</td>
<td>Case control study</td>
<td>N=13</td>
<td>BP</td>
<td>Prolonged sitting</td>
<td>P&lt;0.01</td>
</tr>
<tr>
<td>Nairn BC et al (19)</td>
<td>Case control study</td>
<td>N=10</td>
<td>BP</td>
<td>Prolonged sitting</td>
<td>P=0.01</td>
</tr>
<tr>
<td>Newtony-Czupryna O et al(20)</td>
<td>Case control study</td>
<td>N=144</td>
<td>BP</td>
<td>Posture</td>
<td>P&lt;0.005</td>
</tr>
<tr>
<td>O’Keeffe et al (21)</td>
<td>Case control study</td>
<td>N=21</td>
<td>BP</td>
<td>Posture</td>
<td>P=0.005</td>
</tr>
<tr>
<td>O’Sullivan et al (22)</td>
<td>Case control study</td>
<td>N=120</td>
<td>BP</td>
<td>Posture</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Schnkel-Ivy et al (25)</td>
<td>Case control study</td>
<td>N = 10</td>
<td>BP</td>
<td>Posture</td>
<td>P=0.01</td>
</tr>
<tr>
<td>Sterud et al (26)</td>
<td>cohort</td>
<td>N=12550</td>
<td>LBP</td>
<td>Prolonged sitting</td>
<td>OR 1.48 95% CI 1.2-1.83</td>
</tr>
<tr>
<td>Triqueiro MJ et al (27)</td>
<td>RCT</td>
<td>N=637</td>
<td>BP</td>
<td>posture</td>
<td>OR=2.5</td>
</tr>
<tr>
<td>Vidal et al (28)</td>
<td>RCT</td>
<td>N=137</td>
<td>BP</td>
<td>posture</td>
<td>P=0.001</td>
</tr>
<tr>
<td>Watanabe et al (29)</td>
<td>Case control study</td>
<td>N=9</td>
<td>BP</td>
<td>Trunk asymmetry</td>
<td>OR=3.36 P=0.027</td>
</tr>
<tr>
<td>Wirth B et al (31)</td>
<td>RCT</td>
<td>N=836</td>
<td>BP</td>
<td>Posture</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Yildrin et al (32)</td>
<td>Case control study</td>
<td>N=111</td>
<td>BP</td>
<td>Posture</td>
<td>P&lt;0.05</td>
</tr>
</tbody>
</table>
Low back pain is a common orthopaedic problem even among medical students and dental practitioners. Significant association were found between LBP and body posture. Among the dentists oral hygienists and endodontists were the most affected as they were more involved in awkward postures. There is high incidence of low back pain in office workers who are sedentary; leading to a very low activation or no activation of lumbar muscles. The load is transmitted by passive structures like ligaments and intervertebral discs. Due to viscoelasticity of passive structures and low activation of lumbar muscles, the lumbar spine may undergo deconditioning, thus, causing back pain.

An exercise based posture correction program is suggested. Fixed postures must be avoided. Seats offering good lumbar support should be used in office. A wide range of seating adaptation is possible through modification of chair posture, and dynamic seating options may therefore be an important feature in reducing or even preventing back pain caused by prolonged static sitting.

Lumbar lordosis is affected by the trunk-thigh angle and the knee angle. Subjects in seats with backrest inclinations of 110 to 130 degrees, with concomitant lumbar support, have the lowest disc pressure and lowest electromyography recordings from spinal muscles (Fig.2) A seat-bottom posterior inclination of 5 degrees and armrests can further reduce lumbar disc pressures and electromyography readings while seated. To reduce forward translated head postures, a seat back inclination of 110 degrees is preferable over higher inclinations. Work objects are optimum at eye level. Sitting in combination with whole body vibration and awkward posture does increase the association with the presence of LBP (Fig.1).

Driving has been associated with signs and symptoms caused by vibrations as well. The optimal seat would be an adjustable seat back incline of 100 degrees from horizontal, a changeable depth of seat back to front edge of seat bottom, adjustable height, an adjustable seat bottom incline, firm dense foam in the seat bottom cushion, horizontally and vertically adjustable lumbar support, adjustable bilateral arm rests, adjustable head restraint with...
lordosis pad, seat shock absorbers to dampen frequencies in the 1 to 20 Hz range, and linear front back travel of the seat enabling drivers of all sizes to reach the pedals. The lumbar support should be pulsed in depth to reduce static load. The seat back should be damped to reduce rebounding of the torso in rear end impacts.\(^6\)

A lumbar support pillow with a cut-out for the posterior pelvic tissues improved an objective measure of comfort in healthy individuals and patients with low back pain. Lumbar flattening was decreased and thoracolumbar curvature was increased.\(^6\)

**Conclusion**  
Fixed posture and prolonged sitting are risk factors for back pain. Dynamic seating with back support, regular physical activity and back care education helps in prevention of back pain due to postural abnormalities.

**Disclosure of interests:** No relevant disclosures cited

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Image guided interventions in back pain

Swati Chinchure, Krishna Prasad BP, Vijay Jayakrishnan, Zeeshan Lakhani, Kurian Ninan.
Department of Clinical Imaging and Interventional Radiology, Aster Medcity, Kochi.

Abstract
Low back pain is a common problem that affects most individuals at some time during their lives. Determining the cause of back pain is complicated as it is often multifactorial and multilevel abnormality is common. Morphologic assessment of intervertebral disks, ligaments, nerve roots, facet joints, sacroiliac joints, and paraspinal soft tissues by imaging is important, but may not conclusively indicate the source of pain. Image guided spinal injection procedures serve as an important adjunct to the diagnostic process by providing functional and physiologic information that is not obtained from physical examination and imaging studies. This article reviews basic principles of the more common image-guided diagnostic and interventional techniques in pain management. These minimally invasive, image-guided therapeutic procedures are a viable option prior to more invasive surgical procedures for back pain.

Keywords:
Spinal, pain, blocks, epidural, interventions.

Introduction:
Back pain is a frequent and costly problem in modern society leading to huge socioeconomic burden. It is the 5th leading reason for medical office visits and the second most common cause of missed work days in United states.1 Approx. 60 – 90% of adults experience back pain at some point in their life.

Clinical triage for back pain focuses on excluding specific pathology and nerve root pain. It aims to differentiate mechanical back pain from more serious underlying spinal pathology and nerve root pain. In clinical practice as well as in the literature, mechanical back pain is usually classified by the duration of the complaints. Low back pain is generally a self-limiting condition, and most patients recover within a few weeks without the need for diagnostic studies. However, physicians need to be on the lookout for red flags that point to more serious conditions that require diagnostic testing.

Red flag conditions indicating possible underlying spinal pathology or nerve root problems and hence needing diagnostic imaging are: Onset of backpain< 20 or > 55 years of age, non-mechanical pain (unrelated to time or activity), previous history of carcinoma, steroids, HIV, suggestion of systemic disease, history of weight loss, progressive neurological deficit, structural spinal deformity and loss of bladder or bowel control (retention or incontinence). Indicators for nerve root problems are low back pain radiating to leg and numbness and paraesthesia in same distribution.

Address for communication:
Dr. Swathi Chinchure, DMRD, DNB, DM (NeuroRadiology)
FNVIR Consultant NeuroRadiology,
Clinical Imaging & Interventional Radiology,
Aster Medcity, Kochi, Kerala, India.
Email: drswathi.chinchure@dmhealthcare.com

Imaging in Low Back Pain:
Determining the cause of back pain is complicated as it is often multifactorial and anatomical abnormalities are common in the spine and may not necessarily translate into clinical symptoms.

Radiograph
Radiograph spine is specially useful in evaluation of trauma, structural bony abnormalities, alignment, gross degenerative abnormalities, transitional vertebra.

MRI
Magnetic resonance imaging (MRI) is the preferred investigation for most spinal diseases with its high contrast and spatial resolution and lack of ionizing radiation, and is increasingly requested for people with low back pain.

Indications:
1. Severe or progressive neurological deficits.
2. For cases in which serious underlying pathology is suspected.
3. Planning surgical management in cases of radiculopathy and spinal stenosis.

MRI is considered by many to be the best imaging technique for the investigation of back pain. Yet MRI also has limitations and drawbacks. Studies often were not able to identify any MRI abnormality associated with pain for most backpain patients. Sensitivity to MR has been proven to be low in the detection of symptomatic internal disc disruption and annular tears specially in the thoracic and cervical spine.2,3,4 Another problem with MRI is the high prevalence of abnormal findings among individuals without back pain.5,6,7 It is very important to evaluate the clinical significance of pathological findings on demonstrated on MR imaging study.
Provocative discography

Provocative discography involves injection of contrast medium into the disc nucleus to define its morphology; and simultaneous evaluation of the patient's response to pain reproduction after this increase in intradiscal pressure. Therefore, provocation discography can determine if this anatomic location is a pain source. It is based on the concept that if a particular disc is the source of pain, stressing it should result in reproduction of that pain. Furthermore, if the disc is not the source of pain, then when stressed, it should either not cause pain or it may produce pain that is atypical (discordant) of the underlying pain.

Indications for discography include, but are not limited to:

1. Correlation of the abnormality with the clinical symptoms. Such symptoms may include recurrent pain from a previously operated disc.
2. Patients with persistent, severe symptoms in whom other diagnostic tests have failed to reveal clear confirmation of a suspected disc as the source of pain.
3. Failed back surgery to distinguish between painful pseudoarthrosis or a symptomatic disc in a posteriorly fused segment.
4. To assess disc prior to spinal fusion.
5. Assessment of candidates for minimally invasive surgical intervention.

Contraindications for discography are patients with known bleeding disorder and those on anticoagulation therapy, skin infections over the puncture site / systemic infections, allergy to contrast, localized bony fusion that do not allow access to the disc and severe spinal canal compromise at disc level to be investigated. Lumbar discography should be performed by well experienced proceduralist and in sterile conditions and fluoroscopic imaging. In this diagnostic test, contrast is injected into the spinal disc(s) that are presumed to be the source of back pain. Information assessed and recorded should include the volume of contrast injected, pain response, with particular emphasis on its locations and similarity to clinical symptoms, and the pattern of dye extravasation.
distribution. Frequently, discography is followed by computed tomography scanning. Dallas discogram description is used for interpretation and grading of disc disruption on CT scan.\(^6,10\) (Figure 1)

The evidence for the lumbar discography is strong for the management of discogenic pain, provided it is performed based on patient history, physical examination, imaging data and analysis of other precision diagnostic techniques.\(^11\) Complication rate of discography is low, and is accepted to be less than 1%.\(^11\) The most serious and frequently encountered complication is discitis. The incidence of infection can be decreased with the use of double needles, prophylactic antibiotics and styleted needles.\(^12\)

**Interventional pain management and percutaneous spinal procedures**

Interventional Pain Management can be defined as the subspecialty of medicine that is devoted to the diagnosis and treatment of pain and its related disorders. Spinal interventions may be performed safely on an outpatient basis by proceduralists who are familiar with fluoroscopic anatomy, radiation safety, and the technical components of these procedures. These procedures are used as pain management techniques, to decrease dependence on oral pain medication, and increase physical performance. The benefits of spinal injections include the direct delivery of therapeutic substances to the site of the abnormality in contrast to systemic doses of steroids. Spinal injections should be imaging-guided, relying on anatomic landmarks and the judicious use of contrast material for added safety. Contrast injection is performed to confirm the site of injection, to assess the anatomy and to document the subsequent delivery of the therapeutic drugs to the correct compartment.

**Selective nerve root block**

The selective nerve root block (SNRB) is a procedure utilized both for its diagnostic and therapeutic advantages. Pain pathogenesis in cases of nerve root compromise is caused not only by mechanical compression but also due to chemical irritation due to pro inflammatory cytokines. The rationale for nerve blocks is to tackle the inflammatory component. The objective is not to provide the cure but the temporary pain relief during the time required for resolution of radiculopathy.

Selective nerve root blocks have been used to confirm diagnosis of radicular pain symptoms in patients in whom other diagnostic tests do not clearly delineate the pain generator. This has been very helpful in patients with multiple level abnormalities, complex postoperative patients with epidural fibrosis.\(^13\) Contraindications to selective nerve block are uncorrected Coagulation disorders, patients on oral antiplatelets or anticoagulants, patients allergic to steroids and infection in the territory.

Two approaches have been described for selective nerve root blocks Subpedicular and retrodiscal approach. The subpedicular approach is currently the one used most frequently in clinical practice (Figure 2). The retrodiscal approach carries less risk of injection in ant radicular artery and is also preferred in cases of severe foraminal stenosis, epidural fibrosis.\(^14,15\)

Cervical nerve blocks should be performed only by proceduralists who has significant experience performing other spinal injection procedures. Precise needle positioning is critical because there are structures immediately adjacent to the nerve sheath that must be avoided. A radiculogram is essential for assuring accurate needle placement prior to the injection of therapeutic substances.

Moderate relief has been shown for selective nerve root blocks in the preoperative evaluation of patients with negative or inconclusive imaging studies and clinical findings seen for nerve root irritation.\(^11\)

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**Figure 2: Selective nerve root injection.** The target point for the needle tip is just below the pedicle at approximately the 6-o’clock position (A). This requires varying levels of obliquity depending on the amount of hypertrophic degenerative change in the adjacent facet joints. The needle must pass just anterior and lateral to the superior articular process at the. The proper depth is reached when the needle tip reaches the posterior aspect of the vertebral body or when the patient experiences radicular pain (B). Contrast injection showing contrast along the L5 nerve root and also in epidural space. In this position, the needle tip is adjacent to the junction of the dorsal root ganglion and the nerve root.
Facet block:
The facet joints are paired synovial joints formed from the articulation of adjacent inferior and superior articular processes. As a synovial joint, it may be affected by any of the inflammatory processes that involve joints, including rheumatoid arthritis and osteoarthritis. Patient typically presents with local paraspinal tenderness over a facet joint, posterior pain aggravated by extension and rotation toward the involved side. Indications for facetal block are to differentiate symptomatic from asymptomatic facet joint alterations.

Median nerve block:
Each joint is innervated by two medial branches, one from above and one from the same level. In the lumbar spine, the medial branch of the dorsal ramus courses from the neural foramen to the joint capsule directly over the medial aspect of the transverse process at the junction with the superior articular process. Medial branch blocks are typically chosen in the setting of pre-procedural screening prior to medial branch rhizotomy, since some studies have demonstrated a higher predictive value for rhizotomy results when medial branch blocks are performed.\textsuperscript{16,17} A negative aspiration is very important specially in cervical region to confirm placement outside the vascular compartment. The accuracy of facet joint nerve block is strong in the diagnosis of lumbar facet joint pain. There is moderate evidence for short and long term improvement in managing low back pain with intra-articular injections of local anesthetic and steroids. The evidence for lumbar Medial branch block in managing chronic low back is moderate for short and long term pain relief.\textsuperscript{11}

Sacroiliac joint injection:
The superior portion of the sacroiliac joint is connected by fibrous tissue, while the antero-inferior third of the SI joint has been described as a true synovial joint.\textsuperscript{14}

The diagnosis of SI joint pain is a diagnosis of exclusion. Other etiologies of pain such as spinal stenosis, herniated disc, and facet degenerative disease must be excluded. Various physical maneuvers have been described to diagnose SI joint pain but may be unreliable due to the lack of intra-observer and inter-observer reproducibility.\textsuperscript{19,20,21} Findings of sacroiliitis obtained by CT are relatively poor predictors of which patients have pain or which patients will obtain relief from SI joint injection.\textsuperscript{22} Bone scan findings also have been determined by some authors to correlate poorly with SI joint symptoms.\textsuperscript{23} MRI allows for detailed evaluation of the SI joint and adjacent soft tissues and is particularly valuable in detecting early changes in the joint in inflammatory and infectious sacroiliitis. Injection of the SI joint has emerged as a diagnostic test, as well as a therapeutic procedure. Indications for the procedure include oedematous change in the SI joints on inversion recovery MR sequences or a positive response to stress maneuvers on physical exam in patients who fail to improve with physical therapy.

Epidural steroid injections:
The rationale for epidural injections is comparable to those for nerve root blocks and aims to diminish the inflammatory component of a neural compromise. In contrast to the selective nerve root blocks, epidural steroid injections have the drawback that the pharmacological agent has to diffuse to the site of inflammation and there is no guarantee that it does so. Indications for epidural block are multilevel nerve root compromise, equivocal cases with abnormal radicular pain, central spinal stenosis.

There are three approaches described — interlaminar, caudal and transforaminal. Interlaminar approach is used in cases with pain emanating from L2-3 level or higher while caudal epidural block is ideal for pain emanating from the lower three lumbar segments. For patients with unilateral radicular symptoms, a transforaminal approach is used. Epidurography is performed to confirm the site of injection, to prevent unintentional vascular or intrathecal injection, and to evaluate for epidural scarring that may prevent adequate dispersion of therapeutic substances within the epidural space.

Generally, complications following fluoroscopically
Guided injections are minor and resolve without morbidity. Obviously, the complication rate associated with spinal injections is higher in inexperienced hands. The incidence of dural puncture is 5% following lumbar epidural steroid injection but in only 0.6% following caudal injection. Other unusual complications are epidural abscess, epidural hematoma, arachnoiditis and CSF Fistula. Failure to use fluoroscopy may result in nerve injury and exacerbation of pain symptoms.

The evidence for managing lumbar radicular pain with lumbar epidural steroid injections is strong for short term relief and limited for long term relief.11

Ganglion Impar block
The ganglion Impar or ganglion of Walther is a solitary retroperitoneal structure at the level of sacro-coccygeal junction. It provides the nociceptive and sympathetic supply to the perineal structures. Indications are chronic persistent coccydynia, Chronic Perineal pain and chronic pelvic or rectal pain- Neuropathic visceral and/ or sympathetic pain secondary to radiation/cancer. Two approaches have been described transanococcygeal and transacroccocygeal techniques. The former is techniqually difficult with high degree of failure.24-25 Trans-acrococcygeal technique is safer as well as feasible.24 (Figure 3)

Percutaneous vertebroplasty:
Percutaneous vertebroplasty with acrylic cement (polymethyl methacrylate) is a procedure aimed at preventing vertebral body collapse and pain in patients with pathologic vertebral bodies. Percutaneous vertebroplasty is indicated in patients who exhibit pain resulting from vertebral compression fractures that are due to the weakening associated with bone mineral loss secondary to osteoporosis, hemangioma, malignancy and who are not effectively treated by medical or conservative therapy. The methylmethacrylate is cytotoxic because of its chemical and thermal effects. The temperature during polymerization is high enough to produce coagulation of cells. Therefore, good pain relief can be obtained with a small volume of cement. The degree of compression does not correlate with the quantity of local pain. Minimal compressions may cause incapacitating pain to some individuals. MRI with T1 weighted and STIR images are highly informative. Acute fractures will be easily demonstrated on T1-weighted sagittal images while recent fracture and marrow edema are well demonstrated on short-tau inversion recovery (STIR) images. Computed tomography offers anatomical information but is unable to distinguish acute from chronic fractures under most circumstances. Therefore CT is not part of the routine initial patient workup. It may be very helpful to evaluate the cause of complications that are possible after percutaneous vertebroplasty, such as a cement leak outside the vertebral body.
Transpedicular route is most commonly used and preferable. It is inherently safe and does not carry the risk of needle damage to other adjacent anatomical structures (Figure 4). The parapedicular or transcostovertebral approach was devised to allow access when the transpedicular route is not desirable (e.g., small pedicle). The risk of pneumothorax and paraspinal hematoma increases in parapedicular approach. The cement injection should be monitored in real time under fluoroscopy. Any cement leak outside the vertebral body is an indication to stop the injection. As the amount of compression increases, the degree of technical difficulty of performing the PV may increase as well.

Complications, are higher for inexperienced physicians or those who attempt the procedure without adequate image guidance or cement opacification. In osteoporosis-induced vertebral fractures, clinical reports of complications are around 1%,26,27 The risk of cement leak is higher with a tumor etiology and risk increases with destruction of the posterior wall of the vertebra. With tumor extension into the spinal canal (even without symptoms), vertebroplasty should generally be avoided. The discovery of a motor deficit (or bowel or bladder dysfunction) postprocedure should initiate an immediate surgical consultation. This type of severe complication will almost always be associated with large-volume leaks that have resulted in neurological compression. Cement leaks have been implicated in producing pulmonary embolism.

Conclusions:
Percutaneous spine procedures are safe and effective in pain management. Performance of these injections requires excellent knowledge of the relevant neural and bony anatomy. Complications rates are extremely low and rare when done under imaging guidance.

Disclosure of interests: No relevant disclosures cited

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Acute Febrile Illness - Can we have a method in the madness?

Anup R Warrier
Department of Infectious Diseases and Infection Control, ASTER Medcity, Kochi

Abstract
Evaluation of acute febrile illness is one of the most common clinical problems facing a clinician. The identification of etiology using sound clinical evaluation (history and examination), prudent use of laboratory investigations and completion of treatment with appropriate antimicrobial use is the focus of this review. The relevant literature from India has been reviewed, especially because the etiology of acute febrile illness varies with the region and also season. Once clinical evaluation has ruled out “sepsis” and any localized infection (like Pneumonia, urinary tract infection, arthritis or intra-abdominal infection etc.), the focus is on undifferentiated fevers – the common etiologies for this in our region are tropical infections (including viral) & tuberculosis, followed by liver abscess. Masterly inactivity in the first 2 days, use of inflammatory markers, blood counts & antigen based tests in the next few days and then after 5-6 days of illness, to utilize appropriate serology is the recommended approach. Antibiotic therapy is limited to those who have sustained fevers beyond 3 days with elevated biomarkers of inflammation and after a definite diagnosis of viral syndrome or malaria has been ruled out.

Keywords
Fever, Antibiotic therapy.

Introduction
Acute febrile illness is one of the commonest syndromes to present in any healthcare facility. Kerala has been blessed with the monsoon and its constant companion, the fever epidemics. Every year, the health care system in Kerala is stretched to its limits to accommodate the ever increasing numbers of acute febrile illness. Fever is termed to be acute when the time to presentation from the time of onset is less than 2 weeks, and when history and clinical examination does not suggest a specific diagnosis, it is termed as “undifferentiated” febrile illness.

Epidemiology
The Integrated Disease Surveillance Project in Kerala published its report on the status of communicable diseases in Kerala from 2006 to 2010 (5 year trends) and the statistics are appalling. Dengue cases reported were 1019 in 2006 with 5 deaths, compared to 2597 cases & 17 deaths in 2010. There were just 54 confirmed cases of Chikungunya in 2006 and in 2010 it was 210. The actual numbers are likely to be many times these published figures. Kerala had some of the highest acute morbidity rates among all states – 57 to 59 per 1000 population – in 2000.

The commonest diseases presenting as acute febrile illness in our part of the world are the so called “tropical infections”. These include Malaria, Dengue, Chikungunya, Leptospirosis, Scrub Typhus and Enteric Fever. The idea of a systematic approach to this syndrome is to accurately identify the etiology when possible, with rational and judicious use of laboratory tests and provide appropriate therapy, especially limiting inadvertent use of antimicrobials in viral syndromes, while ensuring that bacterial infections are “covered”. It is with this intent that review of relevant literature was attempted.

Diagnostic Approach
With this etiological profile, what should be our diagnostic approach to acute febrile illness? Using serology alone to differentiate among the common tropical infections is unwise. We have a significant sero-prevalence even in our “normal” population to justify the diagnosis based on only a one time serological report. We have an example of a protocol based approach to acute febrile illness (Figure 1) from the prospective study of...
more than 300 patients done at Sundaram Medical Foundation, Chennai.9

The most interesting finding of the study was that in 75% of the patients, the fever defervescence occurred without the need for any investigations and in 53% fever resolved without any antibiotics.

For our region, based on the current epidemiological trends, the following approach to acute febrile illness seems pragmatic. In a patient presenting with fever the first step is to know whether the infection has any organ localization or not, if the patient has any alarming symptom, which needs admission or urgent referral and to identify associated co-morbid conditions. Patients identified as sepsis or those with definite localizing signs/symptoms will have directed laboratory tests and targeted antibiotic therapy as per hospital policy and specific Syndromic/disease recommendations. Every effort must be made to identify the “eschar” – typical of Scrub Typhus (Picture 1). The common locations are depicted in the figure 2.10 It is clear from typical distribution of an eschar that unless it is specifically looked for in the “hidden” areas, we will miss the opportunity to diagnose this possibly fatal infection. The clinical response to doxycycline is dramatic, and the patient is saved from expensive broad spectrum antimicrobial therapy.

Those with no localizing features will be evaluated based on the day to presentation as per the previous protocol (Sundaram Medical Foundation). Those presenting on day 3 or 4 will also be evaluated with Dengue NS1 antigen, Hanta Virus Serology (seroprevalence of Hanta Virus in acute febrile illness in Indian study was 14.7%11), and Chikungunya IgM and Rapid malaria (card) test along with CRP estimation. Similarly, those presenting beyond one week of illness will be evaluated with Leptospirosis IgM, Dengue IgM, Chikungunya IgM and Scrub Typhus IgM along with a CRP estimation and blood cultures, and Ultra Sono Gram Abdomen.

Treatment

Antibiotics will be withheld if the tests are suggestive of Dengue, Chikungunya or Hanta Fever. Patients with positive tests for malaria will be treated with Artesunate combination therapy (ACT) as per WHO guidelines. The rest of the patients, the group with elevated CRP12 (especially above 15) will receive antibiotics targeted at Leptospirosis, Scrub Typhus & Enteric Fever. The options are either oral Azithromycin13 (at
20mg/kg/day for 5-7 days) or Ceftriaxone with Doxycycline. Use of Cefexime (especially at usual doses) and Quinolones are discouraged. Cefexime is ineffective against Leptospirosis & Scrub Typhus, and even for Salmonella at the usual doses. Quinolones are unpredictable for Typhoid due to significant prevalence of Quinolone resistance among Salmonella typhi/para-typhi and it is also inferior for Scrub Typhus & leptospirosis.

An elevated ESR >50 mm (in the first hour) in a short febrile illness is suspicious of an underlying chronic to sub-acute illness once we have ruled out co-existence of anemia. Among these patients and those who do not fit into a definite diagnosis of any of these tropical infections, Tuberculosis must be considered and evaluated for. The long half-life of ESR vis-à-vis CRP makes it unlikely for ESR to be significantly raised in an acute illness of less than a week duration (Figure 3).

Disclosure of interests: No relevant disclosures cited

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Aortic aneurysms of the thoracic aorta have been estimated to have an incidence of 6 to 10 per 100,000 person years. A poor natural history of untreated aneurysms, characterized by progressive dilatation and rupture with sudden death, has been described with a five year survival of only 15 - 55%. The traditional open surgical repair of such aneurysms is fraught with a lot of complications and risk. A completely endovascular repair of such aneurysms has the disadvantage of blocking major branches of the arch of aorta. Thus, hybrid procedures have evolved to treat this complex set of patients. Endovascular stent grafts are used to treat the aneurysm while the "debranching" of aorta is accomplished by connecting bypass grafts to the affected major branches of the arch.

Case Report

We report the rare case of a 57 year old patient with Marfan’s syndrome who had previously undergone Bentall procedure. He now presented with a new aneurysm of the arch of aorta involving the origin of left subclavian artery and the descending thoracic aorta. Given the diagnosis and past history of open surgery, it was decided to do a hybrid procedure for this patient.

This patient was initially taken up, under general anesthesia, by the cardiothoracic and vascular surgeons for right subclavian artery to left subclavian artery “necklace” grafting using 6mm ringed Atrium graft. Subsequently, the right femoral artery was also surgically exposed by the surgeons. femoral artery and left brachial artery access were secured.

Left brachial artery was cannulated with 6F Balkin sheath. Left Subclavian artery angiogram was done. Left subclavian artery was blocked at the ostioproximal segment using Amplatzer Vascular Plug II 14mm device. The device was placed in position but released only after the stent graft was in position.

Temporary pacing lead was inserted at right ventricular apex via left femoral vein. This was used for rapid ventricular pacing during angiography and during positioning and deployment of the stent graft. The reduction in cardiac output enabled better quality angiograms and better control over the exact positioning of the stent graft.

Marker pigtail was positioned at arch via left femoral artery. 36 x 36 Medtronic Valiant aortic
A stent graft was positioned at ostium of left common carotid artery via right femoral artery. After careful positioning covering the left subclavian artery ostium and sparing left common carotid artery ostium, the stent graft was deployed successfully. The Amplatzer Vascular Plug in the left subclavian artery was finally released and there was no antegrade flow in the proximal left subclavian artery. The flow in the distal subclavian artery was seen to be adequate from the bypass graft from the contralateral subclavian artery. The final position of the stent graft was confirmed by angiography. Balloon dilatation was done at the proximal part of the stent graft to achieve good apposition to the vessel wall. The right femoral artery was repaired by the surgeon and the wound closed in layers. The patient withstood the procedure well. He was shifted to the Cardio Thoracic Intensive Care Unit in a hemodynamically stable condition.

The patient had an uneventful recovery post-procedure. He was extubated the next day. At discharge, he was ambulant without any symptoms and had normal urine output and stable vitals.

**Discussion**

This was a patient with Marfan’s syndrome who already had Bentall procedure done for replacing the aortic valve and the aortic root with proximal ascending aorta due to progressive enlargement and aneurysmal dilatation. He would have been a high risk candidate for a second open surgical procedure. A hybrid procedure was a good solution for his current problem of a new aneurysm of the aorta involving the left subclavian artery and the descending thoracic aorta. While the surgical team did the necklace grafting of the subclavian arteries and provided the vascular access in the right femoral artery, the interventional team closed the left subclavian artery at the ostium and excluded the aneurysm by accurate placement of the endovascular stent-graft.

Proper revascularization of the major branches of the aortic arch plays a large role in the success of the procedure. Buth et al reported a hybrid procedure in 1998 where the left common carotid and left subclavian arteries were grafted with a bifurcated graft from ascending aorta before endovascular stenting. In our case, the left subclavian artery origin was involved in the aneurysm and necessarily had to be closed by the stent graft. Hence, a necklace graft from the contralateral subclavian artery was considered as a suitable option. It also became imperative to close the ostium of the vessel with a vascular plug so that there is no endoleak by reversed flow from the bypass graft.

The use of rapid ventricular pacing and subsequent low pressure in the aorta due to reduced cardiac output helped in using lesser amounts of dye during angiography as well as in the accurate positioning of the stent graft. This was necessary to avoid compromising the flow to the left common carotid artery.

Thoracic endovascular stent grafts have now become popular in the treatment of descending thoracic aneurysms. With increasing numbers of hybrid procedures that achieve “debranching” of the aorta, the endovascular procedure is now a realistic treatment option in aneurysms of the arch also.

**Conclusion**

We report a unique hybrid thoracic aortic aneurysm repair with vascular plug closure of left subclavian artery and necklace grafting of the subclavian artery in a patient with Marfan’s syndrome and post-Bentall procedure in Aster Medcity, Kochi. The successful procedure and satisfactory patient outcome was made possible by the combined and dedicated efforts of all members of the Aster Cardiac Sciences team.

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Chiari 0 malformation with simultaneous cervical intervertebral disc prolapse

Dalvin Thomas, Prakash Nair, Shyam Sundar, Dilip Panikar,
Aster Neurosciences, Aster Medcity, Kochi.

Abstract
Chiari malformations are a group of hindbrain anomalies characterized by tonsillar herniation below the foramen magnum. Chiari malformations were originally classified type 1-4. The anomaly may be associated with hydrocephalus, syringomyelia, myelodysplasia, occipital encephaloceles and cerebellar hypoplasia. Chiari 0 malformation (C0M) includes a small subset of patients who present with syringomyelia without evidence of hindbrain herniation. These patients have features of fourth ventricular outlet obstruction and physical barriers to CSF movement (dural bands, arachnoidal adhesions etc) are seen during surgery. A variety of associated radiological findings may be misattributed as the etiology of the syrinx. We report the case of a patient with symptomatic C0M malformation and prolapsed intervertebral disc (PIVD) in the cervical spine who underwent anterior cervical disectomy and fusion with no relief of symptoms. He was subsequently treated with foramen magnum decompression and had complete relief of symptoms on follow up.

Case report:
A 27 year old gentleman was seen in our outpatient clinic with complaints of neck pain and stiffness of 5 years duration, bilateral upper limb numbness of 4 years duration, bilateral upper limb and lower limb weakness of 2 years duration. Magnetic resonance imaging (MRI) revealed C5-6 PIVD, which was causing minimal dural compression and syringomyelia, without tonsillar herniation. He underwent anterior cervical disectomy and fusion. However, he had no relief of symptoms. Three months following the first surgery, he was found to have weakness of distal muscles of both upper limbs and impaired sensation in bilateral C2 and C8 dermatomes. MRI of the cervical spine showed a syrinx extending from C2-C5 without tonsillar herniation and no or evidence of any other spinal tumor (Figure). He then underwent foramen magnum decompression and augmentation duraplasty. Intraoperatively, a dural band and arachnoid adhesions were seen obstructing CSF flow. The band and the adhesions were released and the CSF pathway was restored. On follow up 2 months after surgery, he had significant improvement of his symptoms.

Discussion:
The traditional types of Chiari malformations represent varying degrees of involvement of structures arising from the rhombencephalon (hindbrain). Type I-III have progressively severe hindbrain herniation outside of the posterior cranial fossa as a common feature. Iskandar et al first described CM Type 0 in 1998 in a series of 5 pediatric patients with syringomyelia without hindbrain herniation. All these patients underwent posterior fossa decompression and augmentation duraplasty, without any attempt to directly treat the syrinx as in. All had resolution of syrinx and symptom control post-surgery, similar to what was observed in our patient. Good response to surgery indicated the presence of “Chiari-like” pathophysiology in the absence of tonsillar herniation.

Many theories have been presented to explain the genesis of syringomyelia. Gardner's hydrodynamic theory explains the pathogenesis and the development mechanism of communicating central canal cavities, based on foraminal obstruction of the fourth ventricle, which enhanced pulsatile waves in the ventricle (water-hammer-wave) forcing the obex to open and the central canal to expand. Williams proposed the mechanism of the craniospinal pressure dissociation to explain the development of communicating central canal cavities. Ball and Dayan postulated that CSF penetrates in the central canal of the spinal cord through Virchow-Robin spaces or through the dorsal roots, creating syringomyelic cavity on the way.

Careful patient selection is critical when making the diagnosis of Chiari 0 malformation. Without an obvious Chiari I malformation, other etiologies of a spinal syrinx must be conclusively ruled out. Only then can one reasonably expect to ameliorate the clinical course of these patients with posterior fossa decompression.

Key words: syringomyelia, chiari malformation, foramen magnum decompression, hindbrain anomalies.

Address for communication:
Dr. Dilip Panikar
Lead Consultant, Aster Neurosciences
Aster Medcity, Kochi, Kerala
ddilip.panikar@dmhealthcare.com

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Figure 1.

A) T2W showing a syrinx extending from C2 to C4. Postoperative changes seen at C5-6 discectomy (arrowhead), no compression of the spinal cord is seen in the MRI.

B) T2W axial shows tonsils of the cerebellum at the foramen magnum causing ‘crowding’ of the tonsils, brainstem and cerebellum.

C) T1W shows the tonsils reaching the lower edge of the foramen magnum (black arrow), but not descending below the level.

D) T2W axial shows the cervical spinal cord at C2, with a prominent syrinx, this expansion of the central canal was responsible for the symptoms of central cord syndrome in our patient.

References:
Bunny Rabbit Sign

Krishna Prasad BP, Vijay Jayakrishnan, Swati Chinchure, Zeeshan Lakhani, Kurian Ninan, Department of Clinical Imaging and Interventional Radiology, Aster Medcity, Kochi.

Bunny rabbit sign is seen in spectral Doppler when vertebral artery is Doppler insonated in a patient with proximal subclavian artery stenosis. The sign is due to stealing of blood by the ipsilateral upper limb through the vertebral arterial system resulting in decrease or reversal of flow immediately post systole. This is accompanied by high flow velocity, and, longer and blunted systolic peak in the contralateral vertebral artery secondary to increased flow.

This significance of identifying steal phenomenon in pre CABG evaluation rests on the fact that there is increased chance of early occlusion and insufficient flow through a by-pass channel constructed using the ipsilateral internal mammary artery for CABG secondary to proximal subclavian stenosis, necessitating using any other vessel or re-implanting its origin into the aorta.

Disclosure of interests: No relevant disclosures cited

Reference

Address for communication:
Dr. Krishna Prasad. MD, FNVIR
Clinical Imaging & Interventional Radiology,
Aster Medcity, Kochi, Kerala, India.
Email : drkrishna.prasad@dmhealthcare.com
Introduction
VTE refers to both deep vein thrombosis (DVT) and pulmonary embolism (PE). The concept of VTE prophylaxis has been present since the late 50s. Sevitt and Gallagher first described the benefit of oral anticoagulation in prevention of VTE after hip surgery\(^1\). This was followed by various other studies which proved the efficacy of prophylactic treatment. The introduction of low molecular weight heparins (LMWH) ushered in a new era and these agents have shown their superiority over conventional oral anticoagulants, albeit having a slightly higher bleeding risk. There has been ongoing research in this field worldwide, and currently, we have a significantly wider range of options, both pharmacological as well as mechanical, for the prevention of VTE.

Major international guidelines
Guidelines for the prevention of VTE have been made by various bodies, but the most noted ones are those of the American College of Chest Physicians (ACCP) and the National Institute of Clinical Excellence (NICE) in UK.

A report by the House of Commons Committee in 2005 suggested that approximately 25,000 people die in UK every year from preventable hospital-acquired VTE. The Committee was alarmed by a survey which showed that 71% of patients with moderate to high risk of VTE did not receive any form of prophylaxis\(^2\). These were the main factors that led to the development of a comprehensive guideline on VTE prophylaxis. A dedicated group comprising of health professionals, representatives of patient and carer groups and technical experts drafted the guideline, making recommendations based on all available evidence.

NICE advocates that patients should be given the opportunity to make informed decisions regarding their treatment in partnership with the health professionals. The guideline advises to assess the risks of VTE and bleeding independently. For medical patients it takes into account all the major risk factors predisposing to thrombus formation. Surgical patients have a few extra check points in addition to those quoted for medical patients. Like the VTE risk factors, the list of bleeding risk factors is also comprehensive and it even considers the risks associated with the timing of lumbar puncture and epidural or spinal anaesthesia. The assessor is prompted to review the medications carefully as the patient may already be on anticoagulant therapy.

The guideline advocates measures to reduce the risk of VTE by mobilising the patient as soon as possible and avoidance of dehydration. Mechanical VTE prophylaxis has to be offered to patients in whom pharmacological prophylaxis is contraindicated. The contraindications as well as precautions related to the use of these devices are clearly explained in the guideline. Guidance regarding specific medical and surgical patients are given in a concise manner and also for pregnancy and puerperium and those admitted to critical care. Finally, it deals with discharge planning and the advice to be given at discharge. The authors also give the scope of the guidance, which defines what it will cover and what it will not cover. Overall, although an elaborate document, the NICE guideline gives the reader a clear understanding of the principles of VTE prophylaxis and also gives pragmatic plans for different groups of patients.

The 9th edition of American College of Chest Physicians (ACCP) Evidence-Based Clinical Practice Guidelines on antithrombotic therapy and prevention of thrombosis was published in 2012. The panel members conducted systematic searches for relevant studies and analysed the evidence, creating tables with quality of evidence and key results. The recommendations made by the panel was related to specific clinical questions and each recommendation had to be supported by the relevant evidence. The recommendations were then reviewed by an authorized panel of external reviewers who had the right of approval or disapproval. ACCP admits that the methodology that it adopted had limitations and that some recommendations would have benefited from meta-analyses as opposed to evidence-based systematic review.
The guideline developers, like the NICE Committee, also looked at patients’ values and preferences regarding antithrombotic therapy. It also addresses the different groups of medical and surgical patients as done in the NICE guideline. In fact, there are separate guidance documents for non-surgical, non-orthopaedic and orthopaedic surgery patients.

In addition to the NICE and ACCP guidelines, the American College of Physicians (ACP) had produced a guideline in 2011. This was meant specifically for medical patients including those admitted with stroke. Like the ACCP guideline which came out subsequently, the ACP guideline was developed based on evidence review, which guided formulation of the recommendations. Interestingly, it recommends against the use of graduated compression stockings, which continue to feature in the NICE and ACCP guidelines.

Acceptance and implementation: some literature reviews

The uptake of any of these guidelines has been quite slow in the Indian subcontinent. This is predominantly due to lack of awareness and also due to the fact that the general concept among physicians and surgeons is that VTE is relatively low in the Indian population. It is unfortunate that there have not been many well designed research studies as in the west. The vast majority of the studies have been observational.

The ENDORSE (Epidemiologic International Day for the Evaluation of Patients at Risk for Venous Thromboembolism in the Acute Hospital Care Setting) study had an Indian subset, of whom only a minority received ACCP-recommended thromboprophylaxis. The compliance was only 16.3% for surgical and 19.1% for at-risk medical patients. The VOICE Asia study was a multinational observational cross-sectional study conducted in 5 Asian countries including India. The study’s conclusion was that there was substantial underestimation of VTE risk and non-adherence to guidelines for thromboprophylaxis in medical ICU patients. Interestingly, a survey conducted among 100 practising general surgeons in India showed that 97% of them had encountered VTE in clinical practice and 49% had seen mortality due to pulmonary embolism. Only 33% of the surgeons had an institute-based protocol for VTE prophylaxis and there appeared to be wide disparity in the prophylaxis methods used for various risk groups of patients. A Malaysian study involving 88 consecutive patients who underwent operations for fracture of the proximal femur or total hip or knee replacement showed 62.5% incidence of DVT. None of the patients had received any form of prophylaxis and the diagnosis was confirmed on bilateral ascending venography performed between 6 and 10 days after the operation. The authors commented that the incidence was similar to Western population and advise reconsideration of the VTE prophylactic strategy in patients undergoing high-risk orthopaedic procedures.

To add to the complexity of the situation, some authors, especially from India, have questioned the need for routine VTE prophylaxis. A study conducted by Mavalankar AP, et al showed only 7.2% incidence of DVT in a group of 125 patients admitted for procedures which included total knee and hip joint arthroplasty and surgeries for fractures of the lower limb, with no prophylactic measures used for any of the patients. This series did not have a single diagnosis of pulmonary embolism. The authors recommended further studies to be done on a larger scale in multiple centres. Jain V, et al had conducted a prospective study of 45 patients who underwent total hip arthroplasty (THA) and 26 patients who underwent total knee arthroplasty (TKA). None of the patients received any form of VTE prophylaxis. All of them underwent preoperative and postoperative screening, but DVT was diagnosed in only 2 of the THA patients and none in the TKA patients. Another prospective study done in India of 147 patients who underwent major orthopaedic surgery without any prophylaxis showed an overall incidence of VTE of only 6.12%. The incidence of PE was only 0.6%. The procedures included total knee replacement (TKR), total hip replacement (THR) and proximal femur fracture fixation (FFF). The incidence of DVT following THA was studied by a group of researchers in Singapore. 197 patients who underwent THA or a revision procedure without any form of prophylaxis were the subjects of the study. This

### Table 1: The Padua Prediction Score.

<table>
<thead>
<tr>
<th>Baseline features</th>
<th>Score</th>
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<tbody>
<tr>
<td>Active cancer</td>
<td>3</td>
</tr>
<tr>
<td>Previous VTE (with the exclusion of superficial vein thrombosis)</td>
<td>3</td>
</tr>
<tr>
<td>Reduced mobility</td>
<td>3</td>
</tr>
<tr>
<td>Already known thrombophilic condition</td>
<td>3</td>
</tr>
<tr>
<td>Recent (&lt;1 month) trauma and/or surgery</td>
<td>2</td>
</tr>
<tr>
<td>Elderly age (&gt;70 years)</td>
<td>1</td>
</tr>
<tr>
<td>Heart and/or respiratory failure</td>
<td>1</td>
</tr>
<tr>
<td>Acute myocardial infarction or ischaemic stroke</td>
<td>1</td>
</tr>
<tr>
<td>Acute infection and/or rheumatologic disorder</td>
<td>1</td>
</tr>
<tr>
<td>Obesity (BMI ≥30)</td>
<td>1</td>
</tr>
<tr>
<td>Ongoing hormonal treatment</td>
<td>1</td>
</tr>
</tbody>
</table>

High risk of VTE is indicated by a score of 4 or more.
Table 2: Risk Stratification Schema based on NICE guideline

<table>
<thead>
<tr>
<th>Step 1</th>
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</thead>
<tbody>
<tr>
<td>Surgical patient</td>
<td>Medical patient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expected to have ongoing reduced mobility relative to normal state</td>
<td>Not expected to have ongoing reduced mobility relative to normal state</td>
<td>(no need for further risk assessment)</td>
<td>VTE prophylaxis not required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 2</th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment</td>
<td>Initial</td>
<td>24 hr</td>
<td>Assessment</td>
</tr>
<tr>
<td>Active cancer or cancer treatment</td>
<td>Significantly reduced mobility for 3 days or more</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age &gt;60</td>
<td>Hip or knee replacement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dehydration</td>
<td>Hip fracture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Known thrombophilia</td>
<td>Critical care admission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obesity (BMI &gt;30Kg/m2)</td>
<td>Total anaesthetic + surgical time &gt;90 mins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One or more significant medical comorbidities (heart disease; metabolic, endocrine or respiratory pathologies; acute infectious diseases; inflammatory conditions)</td>
<td>Surgery involving pelvis or lower limb with total anaesthetic and surgical time &gt;60 mins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal or first-degree relative history of VTE</td>
<td>Surgery with significant reduction in mobility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of hormone replacement therapy</td>
<td>Varicose veins with phlebitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of oestrogen-containing contraceptive therapy</td>
<td>Pregnancy or &lt;6 weeks post partum</td>
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<table>
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<tr>
<th>Step 3</th>
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<tbody>
<tr>
<td>Choose one of the following</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Active bleeding</td>
<td>Neurosurgery, spinal surgery or eye surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquired bleeding disorders (e.g. acute liver failure)</td>
<td>Other procedure with high bleeding risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concurrent use of anticoagulants known to increase risk of bleeding (e.g. warfarin with INR &gt;2)</td>
<td>Lumbar puncture/epidural/spinal anaesthesia expected within the next 12 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thrombocytopenia (platelets &lt;75x109/L)</td>
<td>Lumbar puncture/epidural/spinal anaesthesia within the previous 4-hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Untreated inherited bleeding disorders (such as haemophilia and von Willebrand’s disease)</td>
<td>Acute haemorrhagic stroke</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncontrolled hypertension (230/120mmHg or higher)</td>
<td></td>
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<thead>
<tr>
<th>Step 4</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Choose one of the following</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient has no VTE risk factors</td>
<td>VTE prophylaxis not required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient has VTE risk factors AND bleeding risks</td>
<td>Prescribe mechanical prophylaxis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient has VTE risk factors and NO bleeding risks</td>
<td>Prescribe drug prophylaxis +/- mechanical prophylaxis based on clinical situation</td>
<td></td>
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</table>

included 19 Indians, in addition to Chinese, Malays and Eurasians. Duplex ultrasonography was done on the 5th postoperative day for all patients. 15(8%) patients had DVT and only one had PE. The authors concluded that routine prophylaxis may not be indicated in Singaporean patients. Another interesting study conducted in Pakistan to evaluate the efficacy and safety of LMWH as VTE prophylaxis following TKR showed a significant incidence of bleeding complications, which the authors felt was higher when compared to Western literature81.

Risk assessment models (RAMs)

Data from RAMs were used in the ACCP guidelines, but the authors point out that the limitations of most RAMs include lack of prospective validation, applicability only to high-risk subgroups, inadequate follow-up time and excessive complexity. The Padua Prediction Score
(Table 1) was looked at in great detail for medical patients with the conclusion that it is an useful tool, even though it is not designed to assess for bleeding risks in addition to thrombosis risks. The Rogers and Caprini scores have been used in the assessment of non-orthopaedic surgical patients, but no specific scoring system has been recommended for orthopaedic patients.

Another model which has gained some recognition is the Autar DVT scale. This was developed in 1994 by Dr Ricky Autar, who subsequently was selected to be a member of the NICE Guideline Development Group. The Autar scale, although useful in a variety of clinical settings, does not assess for bleeding risks and it seems to lack prospective validation like most of the RAMs.

Although it is useful to have a scoring system which guides the clinician to make the correct choice for all patients, irrespective of whatever baseline characteristics they may have, such an ideal system is not yet available. Moreover, some researchers strongly discourage using point-based risk assessment models, and instead, advise simple risk stratification schema. An example of one such schema is shown in Table 2. This is based on the NICE guideline and has been adopted by many British hospitals. It has also been approved for use at Aster Medcity by the Hospital Thrombosis Committee.

**References:**

**Conclusions:** VTE prophylaxis remains a contentious issue, especially in Asian countries, despite the widespread availability of literature which justifies its use and also good quality evidence-based guidelines. The practices vary widely and there is a pressing need to increase the awareness about this very important topic and also institution of locally acceptable guidelines, which conform to international standards still. This has to be complemented with a system of effective quality monitoring by regular audits. The primary role of the clinician is to assess each patient individually, taking into account all the risk factors and to prescribe prophylaxis if it appears to be clearly indicated. It is also his responsibility to keep himself abreast of the developments in the field and review the practices on a regular basis.

**Acknowledgments:**
*The author expresses his sincere gratitude to Dr Vijayamohan, Consultant, Dept. of Orthopaedics, Aster Medcity and Dr Smitha Muraleedharan, Senior Specialist, Dept. of General Medicine, Aster Medcity, for their help with literature reviews.*

**Disclosure of interests:** No relevant disclosures cited

India is a signatory to achieving the commendable socio-developmental targets set out by the Global Scientific community as the Millennium Development Goals (MDGs). Though there has been considerable reduction in IMR over the last decade, as a country, India leads the list of under 5 mortality with nearly 20 lakhs children dying every year. The 4th MDG of ‘Reducing childhood mortality by 2/3’ is a challenging task to reach by the target date of 2015, since South Asian region including India accounts for nearly 70% of the world’s children (figure-1) and infant and neonatal mortality remains unacceptably high in many states in the country particularly those with poor health infrastructure.

An analysis of the causes of death shows that Pneumonia remains the biggest contributor to mortality of under 5 children globally (Figure-2) and this is true for India. It is estimated that nearly 2 lakh of childhood deaths in India every year, as observed by the Indian Academy of Pediatrics (IAP) is due to pneumonia. There is evidence that most severe bacterial pneumonias contributing to death are due to bacterial etiology and thus eminently preventable with available vaccines. It makes it imperative that primary prevention and optimum case management must be implemented sooner than later, if we are to achieve the MDG goals. It is regrettable that unfounded allegations and fears have delayed the introduction of effective pneumococcal conjugate vaccine (PCV) in India till now even after strong recommendation from stake holders like IAP and other advisory bodies of the Government of India.

There is considerable evidence from hospital based studies that S.pneumoniae is the primary pathogen etiologically related to pneumonia and meningitis. There is no doubt that it is also the primary agent responsible for middle ear infections and other upper respiratory diseases causing significant morbidity for children and adults. It is estimated that 40% of all severe pneumonia is caused by S.pneumoniae in the community and along with H.influenzae, is responsible for the majority of deaths due to pneumonia and meningitis.

Proof of burden of disease is an important component of health decision making particularly when introducing the vaccine. However bacteriological identification of cause of pneumonia is difficult since sputum culture is often contaminated and positive blood culture is seen only in nearly 3% of cases. Well conducted vaccine probe studies under controlled conditions have conclusively proven that nearly 40% of x-ray proven pneumonia can be prevented by pneumococcal conjugate vaccine which resulted

Address for communication:
Dr.Kurien Thomas MBBS, MD, MSc
Professor and Head  Department of Medicine,
PIMS Pondicherry
E-mail: kurien123@gmail.com
in 17% reduction in under 5 mortality in Gambia. Efficacy of vaccine is also well established by good evidence by dramatic reduction in disease burden due to S.pneumonia and H.influenza after the introduction of preventive vaccination in both developed and developing countries around the world including USA and UK.

In Brazil the incidence of invasive pneumococcal disease (IPD) reduced from 20.3 to 3.97 per 1000 in children (P=0.00012) with PCV10,and in Uruguay there was 44.9% reduction in X-ray proven pneumonia (P=0.001). Similar results were also noted in Kenya. The additional benefit realized in older people, on pneumonia morbidity and mortality (Grand parent effect) is an indirect benefit of PCV which is note worthy.

There has been considerable evidence generated from India on the sero-epidemiology of IPD in India. Data is available from nearly 20 years of surveillance. Currently it is noted that sero-grouptype1,5,7 are important local serotypes which are not represented in the PCV-7, currently available in the market. However, with the formulation of the new PCV-11 or PCV-14 , the serotype coverage is more than 70% (Figure-3)

Surveillance data show that today India has very low levels (< 10%) of penicillin resistance for S.pneumoniae. But we must be forewarned that even as close to us, as in Sri Lanka, penicillin resistance is in the range of 30%-40%. Vaccination is likely to selectively inhibit the resistant clones, which are included in the vaccine sero-types and hence reduce the spread of bacterial resistance in pneumococci. This is likely to have significant impact on the clinical outcome and cost of management of serious pneumococcal infections in India.

India is in the forefront of vaccine development and is the main supplier of essential vaccines to most developing countries around the world. It is indeed heartening to know that we are in advanced stages of development of an indigenous conjugate vaccine with locally prevalent serotypes. However there is no need to wait for local vaccines to be available, before PCV is introduced into the national program of immunization, since the local vaccine can replace available vaccine at any time. Modeling has shown that early introductions is likely to save nearly 100,000 under 5 deaths annually and there is no justification in delaying the introduction for any reason.

Ministry of Health, Government of India is moving ahead with plans to introduce 3 new vaccines. HIB is already introduced in selected states as part of pentavalent vaccine and over the next year this will be extended to the rest of the country. Preparations for introduction of rota virus vaccine is well advanced and this is expected to be initiated shortly. Pneumococcal vaccine is slotted to be introduced over the next 4-5 years time. Currently efforts are underway to strengthen the surveillance system to monitor base line data on pneumonia, meningitis and IPD so that long term trends can be carefully monitored after the introduction of the vaccine. All stake holders must be vigilant that this deadline should not be further delayed leading to avoidable child hood deaths by disruptive elements in the community with their unfounded agenda and fears about vaccine and vaccine manufacturers.

Childhood mortality cannot be substantially reduced by vaccines alone. Promoting breast feeding, preventing malaria by insecticide nets, zinc supplementation, complimentary feeding along with measures to improve neonatal mortality by aseptic institutional delivery all play an important part. But there is no doubt that vaccines against S.pneumoniae and H.influenzae play an important and essential part in this strategy to reduce child hood mortality.

Global Alliance on vaccine and immunization (GAVI) is an international collaborative effort to increase the speed of utilization of effective vaccines globally. Their efforts have been successful in that, by 2014 most of the developing nations in Asia, Africa and Latin America have included PCV and HIB in routine immunization program. Even our neighboring countries like Sri Lanka, Pakistan and Bangladesh have made the decision to include PCV in the routine immunization of children. Advance market commitments by countries have made it possible to provide the conjugate vaccine at a price which is only a fraction of the current cost and this would be affordable to most developing countries.

Disclosure of interests: No relevant disclosures cited
References:

1. The Millennium Development Goals Report 2014 UNO.
Quality Assurance and Accreditation in Health Care organizations

Gracy Mathai
Chief Quality Consultant, Aster DM Healthcare.

What is Quality?
Doing the right thing to the right patient at the right time. Quality Services in the hospitals are all about Patient Safety.

What is Accreditation?
Public recognition of the achievement of accreditation standards by a healthcare organization, demonstrated through an independent external assessment of that organization's level of performance in relation to the standard.

Accreditation, as we say, is basically a framework, which helps healthcare organization to establish objective systems aimed at patient safety and quality care. Documentation plays an important role in defining such systems. Wherever there are references to documented requirements, it needs to be clearly understood that such documentation need to be established, understood at all levels, reviewed at regular intervals, controlled and evidenced for its effective implementation by way of records.

What is Quality Assurance?
- Process to determine whether products meet customer expectations.
- Ensuring that the organization is providing the best possible products or service.
- Focuses on enhancing and improving the process.
- Demonstrate the hospital's commitment to improving the quality of care that they deliver.
- Outlines the goals and strategies for:
  a. Ensuring patient safety.
  b. Delivering optimal care.
  c. Achieving high patient satisfaction.

Quality assurance is maintained within the hospital with the help of standards which are prepared according to the hospital design, culture and other requirements. Various Policies and Standard Operating Procedures are set up and are strictly followed to achieve the set standards.

Regular audits are conducted in the hospital to monitor the quality functioning of various departments. Both internal and external audits are conducted within the hospital. Internal Quality Audits is a powerful tool for any business to measure the effectiveness of the Quality Management System. It is also a good management tool that can be used to review processes and identify any weaknesses, risks and areas of improvement. Patient satisfaction is assessed, evaluated and monitored regularly. All the patient safety issues are addressed meticulously, deviations are reported, and corrective and preventive actions are ensured after conducting Root Cause Analysis.

What are the Quality Plans?
- Quality Indicator plan identifies standards to be followed.
- Establishes plans, policies, procedures and processes at relevant levels in the organization and ensures implementation.
- Does root cause analysis in cases of non-conformance and takes corrective & preventive action to enable continuous Quality improvement.
- Failure Mode Effect Analysis is done yearly and feasible actions taken to prevent the recurrences of the major Incidents.
- Focuses on International Patient Safety Goals.

Address for communication:
Mrs. Gracy Mathai
Chief Quality Consultant,
Aster Medcity, Kochi, Kerala
gracy.m@dmhealthcare.com
Benefits of Accreditation
Accreditation benefits to all stakeholders: patients, staff, organization, and third parties.

Patients: Patients are the biggest beneficiaries. Accreditation results in higher quality of care and patient safety. The patients get services by credentialed medical staff. Rights of patients are respected and protected. Patient satisfaction is regularly evaluated.

Health Care Organization (HCO): It stimulates continuous improvement of the organization. It enables the HCO in demonstrating commitment to quality care and raises community confidence in the services provided by the organization. It also provides opportunity to healthcare unit to benchmark with the best.

Staff: Staff in an accredited healthcare organization are satisfied as it provides for continuous learning, good working environment, leadership, and above all ownership of clinical processes. It improves overall professional development of clinicians, nurses, and paramedical staff and provides leadership for quality improvement.

Third Parties: Accreditation provides an objective system of empanelment by insurance and other third parties. They will have access to reliable and certified information on facilities, infrastructure and level of care.

The Need for Accreditation
The practice of medicine is changing and patients are not just seeking for health remedies but seeking ‘good health’. The dynamics of the industry in which we operate are changing very rapidly and it is not enough to attain ‘quality’ but to sustain ‘continuous quality improvement’ as an integral part of our day to day life. It can be at work or anywhere else for that matter. To become a quality conscious and quality oriented person is the mantra of success for us as a person and as an organization.

NABH & JCI
There are different models of accreditation, which are broadly classified as follows:

1. The first model of quality assessment gives priority to standards related to available facilities in clinical units.
2. The second model lays stress on quality assurance i.e. process indicators and sets...
standards for those institutions striving to arrive or improve quality of care.

3. The third model is based on the citizen’s charter. This model emphasizes the fact that health systems should be accessible and acceptable to health seekers. The Ministry of Health and Family Welfare, Government of India, established the National Accreditation Board for Hospital and Health Care Providers (NABH) in 2005 under flagship of Quality Council of India (QCI) for accreditation of hospitals in the country. This has also been accredited by International Society for Quality Assurance in Health Care (ISQUA) which is the Accrediting body for organizations throughout the world. The National Accreditation Board for Hospital & Healthcare Providers (NABH) is an accreditation body, which sets and addresses standards for the healthcare provider’s ‘level of performance’ in key functional areas such as patient safety, patient rights, patient treatment, and infection control. NABH standards lead us to improve patient care, safety and continuous quality improvement. This also strengthens the confidence of patients, third party and insurance agencies, providing us a competitive edge. NABH is the accepted standard proposed by QCI for hospitals as it reflects provision of the highest levels of patient care and patient safety. The accreditation standards are functionally divided into 10 chapters. (Table 1) Joint Commission International (JCI) is an international Organization which evaluates hospitals and provides accreditation to the healthcare organization that follows the patient’s safety goals and maintains quality in every aspect of care. The JCI standards are divided into 14 chapters (Table 1) Every patient will look for JCI accredited hospitals for their treatment and health management as JCI expects the healthcare organizations to follow IPSG (International Patient Safety Goals) comprising the following:

- Identify Patients Correctly.
- Improve Effective Communication.
- Improve the Safety of High Alert Medications
- Ensure Correct Site, Correct Procedure, Correct-Patient Safety.
- Reduce the Risk of Health Care-Associated Infections.
- Reduce the Risk of Patient Harm Resulting from falls.

**Process of Accreditation**
This involves:
1. Management Commitment.
2. Training to all employees on the standards
3. Completion of entire documentation – manuals, policies, SOPs etc.
4. Formation of various committees and conducting regular meetings
5. Defining quality indicators, capturing and analyzing the same.
6. Implementation of standards and training on documentation.
7. Mock drills and internal audits.
8. Submission of application to accreditation bodies.

<table>
<thead>
<tr>
<th>NABH Chapters</th>
<th>JCI Chapters</th>
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<tbody>
<tr>
<td>Access, Assessment &amp; Continuity of Care</td>
<td>Access to Care &amp; Continuity of Care</td>
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<tr>
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<td>ACC</td>
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<td>AOP</td>
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<td>Care Of Patients</td>
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<tr>
<td>Anesthesia &amp; Surgical Care</td>
<td>ASC</td>
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<td>Medication Management &amp; Use</td>
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<td>Prevention &amp; Control of Infection</td>
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<td>Quality Improvement &amp; Patient Safety</td>
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<td>QPS</td>
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<td>Governance, Leadership &amp; Directions</td>
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<td>ROM</td>
<td>GLD</td>
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<td>Staff Qualification &amp; Education</td>
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<td>SQE</td>
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<td>Management Of Information</td>
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<td>IMS</td>
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Table 1: Chapters of NABH and JCI
10. Compliance with the non-compliance of external auditors.
11. Final assessment by external assessors
12. Compliance with the non-compliance of external auditors.

The Ten Commandments for Clinicians
1. Write Medication Order in Capital Letters.
2. Document your visit with notes duly signed with the date, time signature and name.
3. Avoid verbal orders.
4. Use alcohol hand rub before and after each patient examination.
5. Make a habit of patient and family education as part of care.
6. Ensure informed consent for all procedures.
7. Assess and re-assess patient as per hospital policy.
8. Prepare and counter sign discharge summaries and talk to patient regarding discharge instructions, follow-up and care at home.
9. Prescribe as per hospital formulary and follow the antibiotic policy.
10. Have formal meetings / briefings with the other specialties when more than one doctor is treating the patient.

Our Slogan is:
“Do Good, Do No Harm to our patients”.

Disclosure of interests: No relevant disclosures cited

Reference:-
Hippocrates, who is regarded as “The Father of Modern Medicine” lived around 400 years before Jesus Christ. We get information about him from the writings of Plato who was a younger contemporary and Meno who was a pupil of Aristotle. Soranus of Ephesus, a Second Century Greek Gynecologist was the first biographer for Hippocrates. We get the personal details of the great physician from this work.

Hippocrates’ father was Heraclides, a physician and his mother was Praxitela. The two sons of Hippocrates, Thessalus and Draco and his son in law Polubus were his students. Polubus became the true successor of Hippocrates. He was born in the Island of Cos in the south west coast of Asia Minor – the present Turkey. Hippocrates taught and practiced Medicine throughout his life and has traveled all across Greece and Asia Minor.

The most important contribution from him was to see a human being as a whole entity. This was contradictory to the then prevalent system of Medicine, which treated symptoms and organs. He was the first person to say that diseases are caused by natural causes and not because of superstitions or gods. He separated Medicine from religion and argued that diseases are caused by environmental factors. He had great faith in the healing power of nature. Putting forward the theory of four Humors (Blood, Phlegm, Black bile and Yellow bile), he believed diseases are due to imbalance of these four and so treatment should be directed towards resetting the balance. Rest and immobilization had capital importance in his armamentarium. He insisted on use of clean water and wine, if needed, to be used on wounds.

Hippocratic Medicine was notable for its professionalism. He gave utmost importance for observation and documentation (two things which we are lagging behind even now). He has made regular notes on pulse, fever, pain, movements, excretion etc. He extended clinical observation to family history and environment. He is the first person to classify diseases as acute, chronic, endemic and epidemic. He also described terms like exacerbation, relapse, resolution, crisis, paroxysm, peak and convalescence.

His major contributions are in pulmonary Medicine. He is the first documented chest surgeon who used lead pipes to drain empyema. He also described diagnostic criteria and treatment methods for hemorrhoids, which hold well even in this era.

As a physician, he paid careful attention to all aspects of practice. He followed detailed specifications for lighting, personnel, instruments, positioning of patients and techniques of bandaging and splinting. He recommends that the physician should always be well-kept, honest, calm, understanding and serious. By laying down the principles behind historic Oath, he made clear that Medicine is a science and needs to be practiced only by well deserved, well trained and committed persons.

What the great visionary instructed his disciples centuries ago still remain relevant and at least to some extent not practiced!
Aster Med-Lit Scan

Compiled by Dr. Musthafa Janeel M
Aster Cardiac Sciences, Aster Medcity, Kochi.

Ed.: This column tracks trending articles and news across the medical world.

1. The trouble with dabigatran BMJ 2014;349:g4681

Dabigatran is one of a new generation of oral anticoagulants (NOAC) for stroke prevention in patients with non-valvular atrial fibrillation recently recommended in guidelines from US, Europe, and Canada. One of the key selling points of the dabigatran is that the drug requires no time consuming anticoagulant activity or drug plasma level monitoring. The BMJ investigators led by Dr Deborah Cohen maintains that there is evidence Boehringer Ingelheim, the makers of dabigatran, failed to share with regulators information on how monitoring plasma levels of the drug and subsequent dose adjustment could reduce risk of major bleeds.

The Boehringer, defended through their website, “Our scientists determined, and the FDA concurred, that the research does not support making dosage decisions based on plasma concentrations—a conclusion based solely on science and patient welfare.” The dabigatran issue have raised concern about the transparency of drug trials and drug approval.

2. 2014 Ebola Virus Disease (EVD) outbreak in West Africa- Update from WHO


The 2014 West Africa outbreak is the most severe of EVD in the recorded history according to data from Centre for disease control (CDC). A suspected 1440 cases with 826 deaths have been reported by the World Health Organization (WHO) as of 30 July 2014 of which 953 cases and 532 deaths have been laboratory confirmed to be Ebola, since the outbreak began in February 2014 from Republic of Guinea. The virus has since spread to Liberia and Sierra Leone. WHO in its travel advisory maintains that person-to-person transmission by means of direct contact with infected persons or their body fluids/secretions is considered the principal mode of transmission. The risk to travelers is considered very low, unless they come in physical contact with infected person.


Treatment of hepatitis C virus (HCV) infection in patients also infected with human immunodeficiency virus (HIV) has been limited due to drug interactions with antiretroviral therapies (ARTs) and the need to use interferon. In this open-label, non-randomized, uncontrolled study, patients with HIV who were co-infected with HCV genotype 1, 2, or 3 who received the oral, interferon-free combination of sofosbuvir and ribavirin for 12 or 24 weeks had high rates of sustained virologic response(SVR). This study along with recent other studies is an indication that HCV has become a treatable condition without the high adverse effect of interferon-based regimen.


The New York Times reported that the new drug sofosbuvir (Sovaldi), which is proving to be curative for Hepatitis C infection, is scaring people because of its high cost. A single pill cost around US $1000 and the entire course of 12 weeks would cost $84,000 for genotype 1 and 2. For genotype 3, the recommended 24 weeks course would cost $1,68,000. In defence, Gilead Sciences, the makers argue that the effects of Hepatitis C with its liver damage can cost the patient much more in the long run. The new drug therapy can effectively cure hepatitis in 90% of patients. But the high cost of Sovaldi has stirred intense debate on drug pricing and how insurance can handle this. Various news agencies reported Gilead’s plan to sell these drugs at much lower price in developing countries. In Egypt the drug is priced at $900 that is around 1% of cost in US. The Hindu (Mumbai, April 18, 2014) reports that in India Gilead is in talk with various local manufacturers and is planning to sell the drug at a cost of 1.5 lakh INR ($2500) for 12 weeks course.

5. Fruit and vegetable consumption and mortality from all causes, cardiovascular disease, and cancer: systematic review and dose-response meta-analysis of prospective cohort studies BMJ 2014;349:g4490

Sixteen prospective cohort studies were eligible in this meta-analysis. During follow-up periods ranging from 4.6 to 26 years there were 56423 deaths (11512 from cardiovascular disease and 16817 from cancer) among 833234 participants. Higher consumption of fruit and vegetables was significantly associated with a lower risk of all cause mortality. There was a threshold of around five servings of fruit and vegetables a day, after which the risk of all cause mortality did not reduce further. A significant inverse association was observed for cardiovascular mortality (hazard ratio for each additional serving a day of fruit and vegetables 0.96, 95% confidence interval 0.92 to 0.99), while higher consumption of fruit and vegetables was not appreciably associated with risk of cancer mortality.