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SICOT e-Newsletter

Editorial

How I correct Adolescent Idiopathic Scoliosis

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Introduction

Scoliosis is characterized by frontal plane curvature of spinal column with axial rotation of vertebrae producing a rib-hump deformity. Adolescent idiopathic scoliosis (AIS) is the most common spinal deformity and is seen most commonly in girls (male:female being 1:10). It is most commonly right-sided and most frequently affects the thoracic spine. AIS can produce unacceptable cosmetic deformity with poor body self-image which may need surgical intervention to prevent curve progression, arrest deterioration in pulmonary function and enhance self-esteem.

Intensive investigations have been undertaken over the past decade to identify genes that predispose an individual to develop AIS. It is a multifactorial condition and several genes have been implicated[1,2].

Clinical Evaluation

A typical AIS curve is convex to right with its apex at T8-9 disc/T9 body with loss of thoracic kyphosis (lordoscoliosis). The most commonly used classification in the contemporary era for AIS is that of Lenke and curves are divided into six types[3]. Thorough clinical examination/detailed neurological evaluation and radiographs are mandatory for all patients. History of back pain is evaluated and all patients fill a new patient pain profile sheet with pictorial representation/description of their pain. Superficial abdominal and deep tendon reflexes should be elicited in all patients as there may be co-existent intra-spinal anomalies. Supine bending views against a bolster placed at the apex of the curve on the convex side are also undertaken to evaluate flexibility. We have a low threshold to get an MRI for all patients at our institute. The presence of any atypical features warrant a complete neurological examination with MRI scans to rule out intra-spinal anomalies[4]. Coned down view of lumbo-sacral junction is done to rule out spondylolysis.

Mild deformities (<300 are observed or braced) and surgery reserved for curves that measure ≥500. Rigid curves may need an anterior release prior to posterior instrumented spinal correction and fusion. Progression of curve despite bracing and unacceptable cosmetic deformity esp. with Riser Gr. 0-II would be indications for surgery.

Surgical Technique

The patient is induced under general anaesthesia with endo-tracheal tube and placed prone on a Jackson table with adequate padding of all bony prominences and pressure areas with face resting on head holder with no pressure on eyeballs. Particular care is taken not to hyperabduct arms as it may stretch brachial plexus in prolonged prone positioning[5]. Safety is of paramount importance and neuro-monitoring is mandatory for all patients. We routinely use multi-modal neuro-monitoring (i.e. TcMEP - trans-cranial motor evoked potentials and SSEP – somatosensory evoked potentials) to monitor cord function especially during corrective maneuvers. A 50% drop in amplitude of TcMEP is considered as true positive. SSEPs monitor the sensory tracts. TcMEP changes normally predate SSEP changes by 5 minutes which is extremely helpful[6]. Hypotensive anaesthesia with MABP (mean arterial blood pressure) of 60mm Hg is desired for exposure and during instrumentation to minimize blood loss. However, prolonged hypotension could cause spinal cord ischemia and is not used for congenital spinal deformities due to precarious cord vasculature[7].

Surgery

The fusion levels (i.e. upper & lower instrumented vertebrae) are decided from radiographs and a midline skin incision is made. The spine is exposed by subperiosteal dissection and cell saver is used to process intra-op blood loss. Surgical packing, gel-foam, bone wax and hemostatic matrix are used liberally to keep blood loss to a minimum. A marker is placed over spinous process and c-arm shot is taken to confirm the vertebral level. Intra-operative c-arm image intensifier is then used to aid in pedicle screw insertions. Our preference is to use mostly pedicle screw based constructs with use of hooks and wires especially in cranial end of instrumentation[8].

Correction

Once all the anchors are secured, a Co-Cr or ultra-strong stainless steel rod of 5.5 – 6.0mm diameter is cut to appropriate length and bent to normal contours in sagittal plane. We sometimes also perform differential rod contouring (concave rod – normal kyphosis and convex rod – hypokyphosis) to aid in ease of reduction and correction. The spinal deformity (sagittal lordosis/coronal scoliosis and axial rotation) is corrected by a combination of maneuvers. We perform selective rod rotation with subsequent coupled derotation to restore spinal balance and alignment. The concave rod is first inserted cranio-caudally and secured to all anchors by provisional tightening. This corrective rod is then rotated by 900 and spine is gradually approximated to the rod from either ends towards the center (i.e. apex of deformity in sagittal plane). The stabilizing convex hypokyphotic rod is then attached to its anchors and spine pushed towards midline (cantilever forces and translation) as the rod is secured to the anchors. Coupled derotation is then performed at the apex of deformity to correct axial rotation with compression of screws on convexity of curves (Fig. 1). Final tightening is then performed and all anchors are double-checked. Judicious use of polyaxial reduction screws ensures safe instrumentation without any pull-out of vertebral anchors. Coupled direct vertebral derotation is very powerful in correcting rib-hump deformity and has virtually eliminated the need for costoplasty. Ponte osteotomies are also performed to enhance restoration of thoracic kyphosis, overall sagittal balance and improve fusion rates.

Once the scoliosis is corrected, the allograft strips are laid over posterior elements over instrumented area mixed with allograft paste to achieve satisfactory inter-facetal, inter-laminar and inter-transverse fusion. We do not routinely use crosslinks. 500mg of vancomycin powder is locally applied over the exposed spine and instrumentation prior to suturing deep fascia[9]. The wound is then closed in layers with the placement of the drain superficial to deep fascia[10]. Fig. 2 shows radiographs of an index Lenke I AIS operated by the senior author (JPD).

Post-op management

The drain is removed in 24-48 hours when output is <30cc/24 hours. Most patients are mobilized from post-op day 2 when they transfer and sit in a chair for a few hours. Most of the patients walk by the 2nd to 3rd post-op day and are discharged home by the 4th-5th post-op day. Some patients may continue to wear orthosis (spinal brace) post-operatively for comfort. All patients are seen in office (clinic) at 1 week, 6 weeks, 3 months, 6 months and at 12 months post-op. Annual follow-up thereafter is undertaken until they complete growth or are discharged from paediatric care as adults to ensure their recovery from the surgery is without any untoward events.

Summary

Surgery for AIS improves cosmesis and enhances self-esteem in a vulnerable group of adolescents. Intra-operative neuro-monitoring, hypotensive anaesthesia during exposure and instrumentation with normo tension during the correction maneuver with a meticulous surgical technique and attention to detail have made scoliosis surgeries very safe. Meticulous soft tissue handling, subperiosteal dissection, wound closure and placement of a drain have all contributed to successful patient outcomes.

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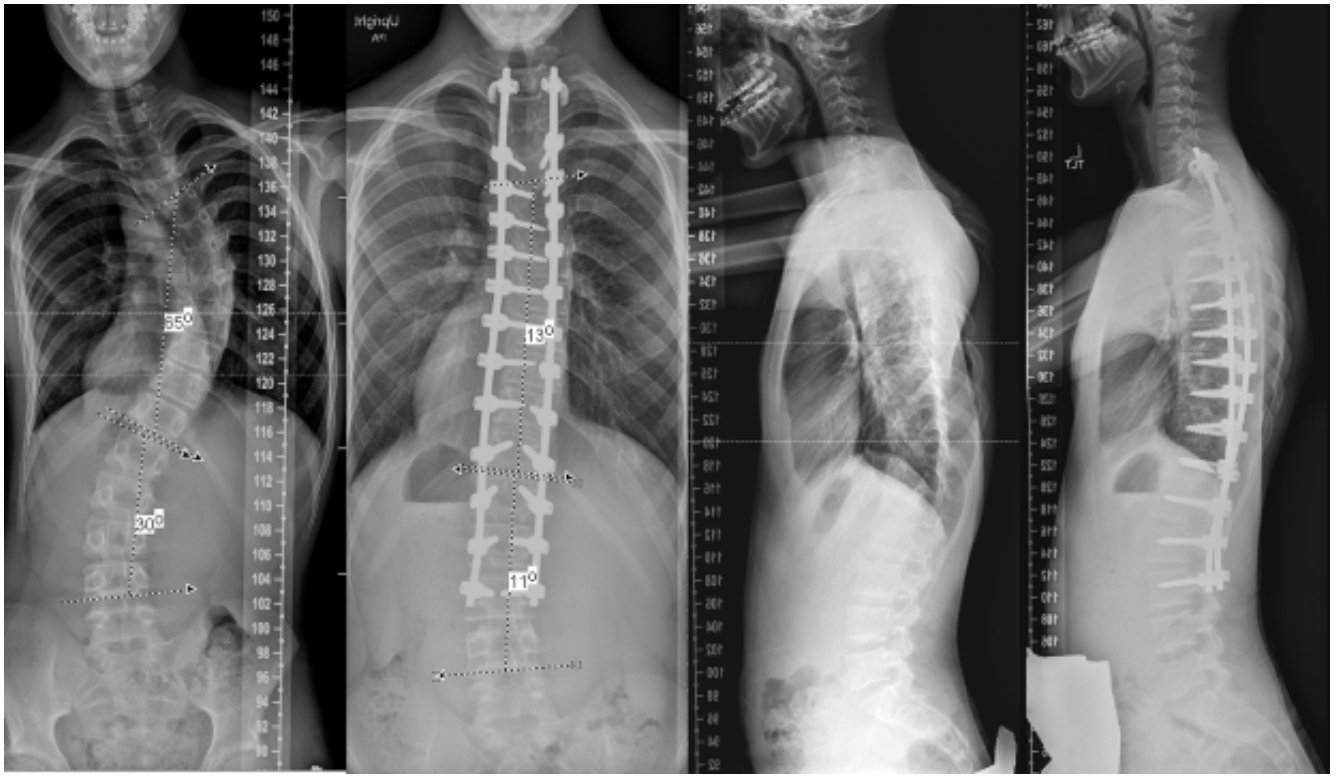

Fig. 1: Pre- and Post-op X-rays (Case 1)

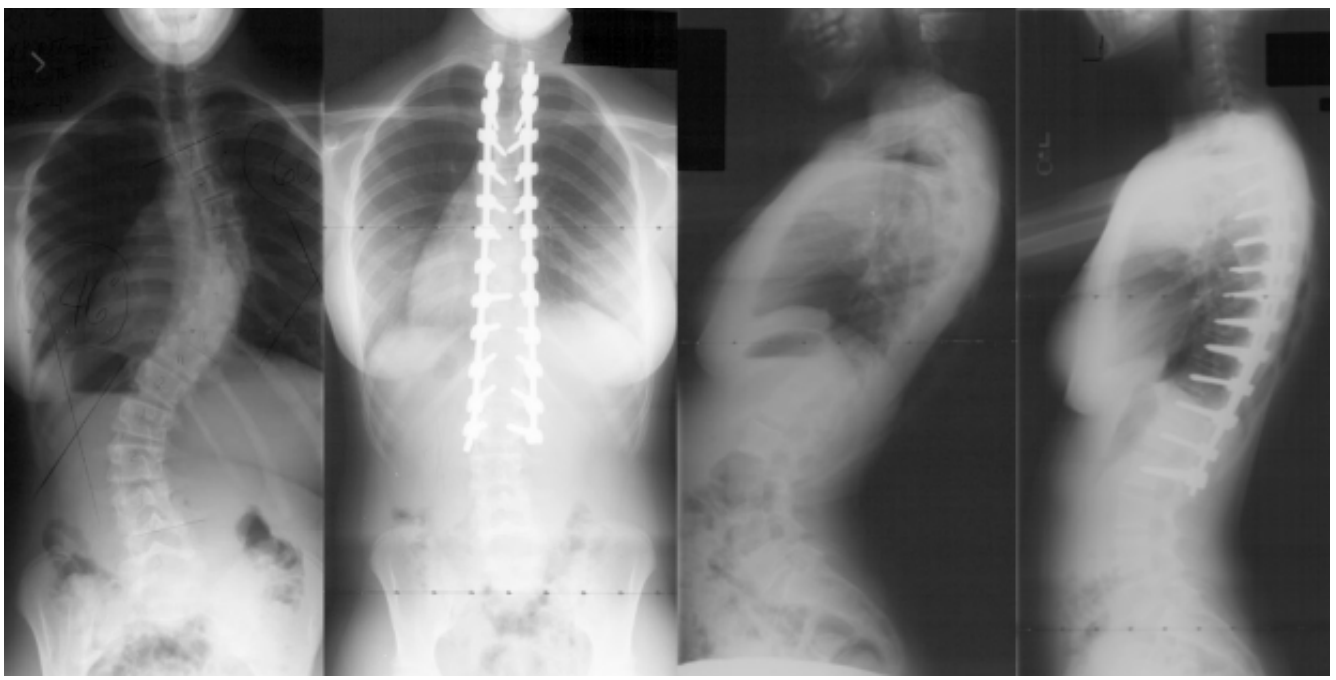

Fig. 2: Pre- and Post-op X-rays (Case 3)

Fig. 3: Pre- and Post-op X-rays (Case 2 – Double structural curve)

SICOT Events

34th SICOT Orthopaedic World Congress (Hyderabad OWC 2013)
17-19 October 2013 * Hyderabad, India

- **Registration**

  Online congress registration is open here until **15 September 2013**!

- **Scientific Programme**

  Don't miss the **Instructional Courses** held throughout the Congress. Registration is open! Read more...
  With the experience of two successful events we are pleased to announce the **3rd SICOT Educational Day** in Hyderabad, India, to be held on 16 October 2013. The theme for this year is 'Trauma'. We have invited expert Faculty from over 10 countries for lecturing on the course. Read more...

- **Social Programme**

  Join us for the entertaining social programme and the chance to experience the rich culture of India.Read more...

- **Sports Programme**

  Detailed information about the Cricket Match to be held on 16 October and the Charity Run/Walk on the morning of 19 October can now be found here.

- **Accommodation & Tours**

  Hotel booking for SICOT 2013 participants at Hyderabad is on! We have secured attractive discounted rates for a number of rooms in different categories of hotels close to the Hyderabad International Convention Centre. Shuttle transportation will be provided between the Congress venue and the official hotels at fixed times in the morning and evening for only those delegates who have booked through the official website: **Online Hotel Accommodation Booking**

- **Exhibition & Sponsorship**

  Hyderabad OWC 2013 is the premier unique opportunity to promote your products and services to leading international orthopaedic surgeons, traumatologists and specialists in related fields. There are also many value-creating sponsorship options available to highlight your organisation's support and contribution to orthopaedics and traumatology. We will help in customising the most suitable option. Read more...

SICOT Global Network for Electronic Learning - SIGNEL

Article of the Month

August 2013

Do we really need closed-suction drainage in total hip arthroplasty? A meta-analysis
Xin-die Zhou, Jin Li, Yan Xiong, Li-feng Jiang, Wei-jun Li & Li-dong Wu

Purpose The clinical use of closed-suction drainage, which aims to reduce postoperative wound haematomas and infection, is common. This study was performed to determine whether closed-suction drainage is safe and effective in promoting wound healing and reducing blood loss and other complications compared with no-drainage in total hip arthroplasty.

Methods The literature search was based on PubMed, the Cochrane Library, MEDLINE, and EMBASE. The data were evaluated using the generic evaluation tool designed by the Cochrane Bone, Joint and Muscle Trauma Group, and then analysed using RevMan 5.0. Twenty randomised controlled trials involving 3,186 patients were included in our analysis.

Results The results of our meta-analysis indicate that closed suction drainage reduces the requirement for dressing reinforcement, but increases the rate of homologous blood transfusion. No significant difference was observed in the incidence of infection, blood loss, changes in haemoglobin and haematocrit, functional assessment, or other complications when the drainage group was compared with the no-drainage group.

Conclusions Our results of the comparison between closed suction drainage and no drainage in THA have indicated that the routine use of closed-suction drainage for elective total hip arthroplasty may be of more harm than benefit.

International Orthopaedics (SICOT)
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SICOT Global Network for Electronic Learning - SIGNEL

Case of the Month

August 2013

Atypical bicipitoradial bursitis

Author: Bassel El-Osta - *London, United Kingdom*

A 77-year-old lady presented to the Orthopaedic clinic with a six-month history of spontaneous gradually worsening pain in the antecubital fossa of the right forearm. This was associated with a discrete lump which grew in size over time. She described the pain as a dull constant ache which could be provoked to sharp pain by elbow and forearm movements, and by heavy lifting. The pain did sometimes radiate to the wrist but there was no tingling, numbness or weakness in the arm. There was no history of any traumatic injury.

Examination revealed a tender (4x3cm) lump over the distal end of the biceps tendon in the antecubital fossa, and there was no joint-line tenderness. She had a full range of movement in the elbow and forearm (extension 0°, flexion 140°, pronation 90°, supination 90°). Examination of the shoulder and wrist revealed no abnormality. Neurological examination of the hand and wrist revealed no sensory or motor deficit.

Figure 1

Plain X-ray radiographs demonstrated calcification at the radial tuberosity.

What is your first thought? And what is the next step?

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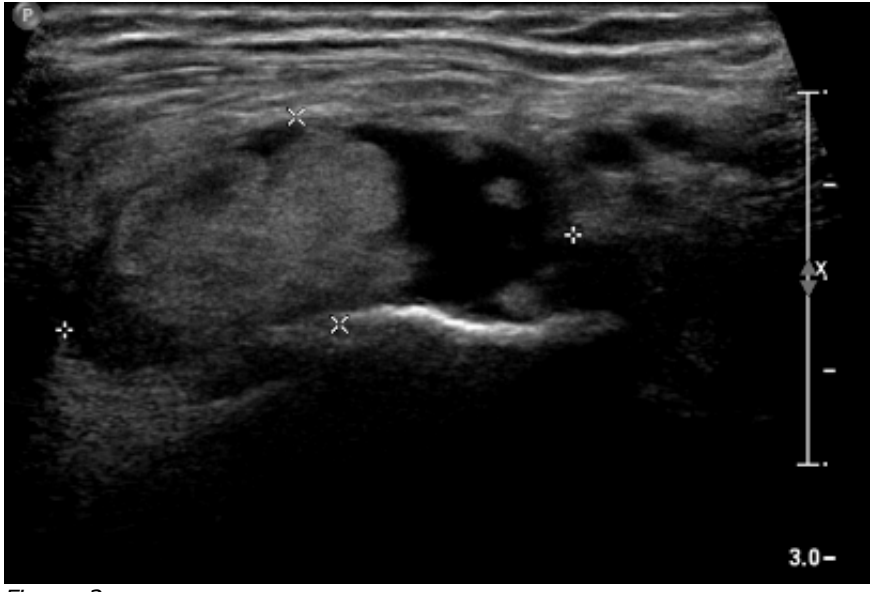

Figure 2

Ultrasound scan was reported as a haematoma secondary to grade 2 brachioradialis muscle rupture.

What next?

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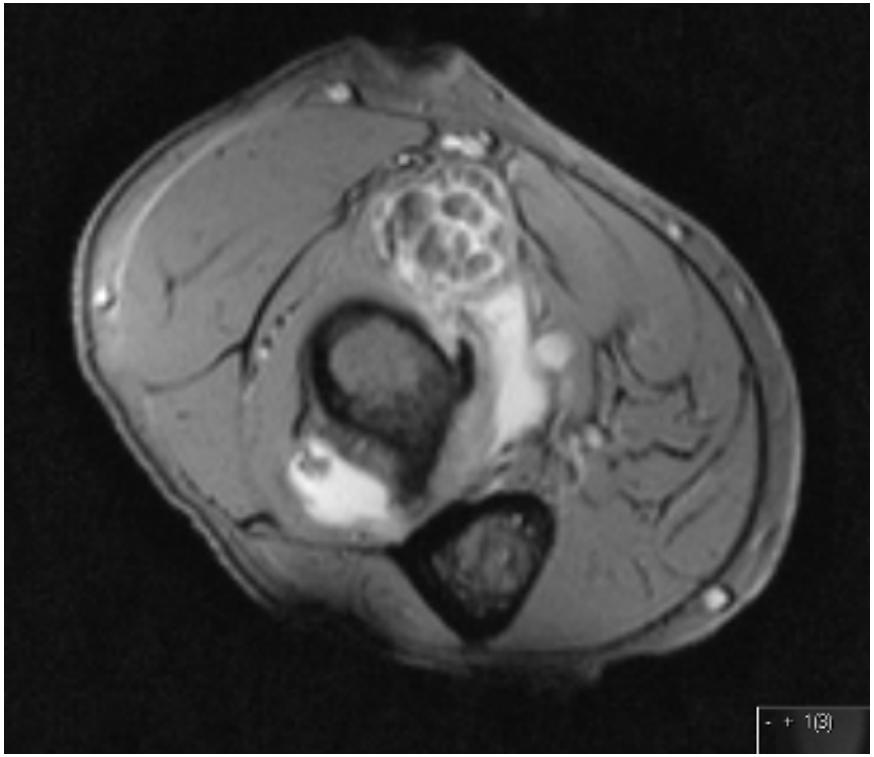

Figure 3

MRI scan was performed which demonstrated a large bicipitoradial bursal swelling surrounding the biceps tendon insertion which contained multiple loose bodies and associated tendonitis of the biceps tendon.

What is the differential?

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1. atypical bicipitoradial bursitis
2. synovial chondromatosis

Treatment?

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Figure 4

Surgery was performed under general anaesthesia and tourniquet, and through a 5cm incision on the lateral border of the distal biceps tendon (Figure 4). There was a large soft tissue lump surrounding the distal biceps tendon, and extending between the radius and ulna to the posterior aspect. The lump had thick wall, and contained small amount of fluid and thick slightly firm lobulated whitish soft tissue masses. Also, there was infiltration of the distal biceps tendon with synovial like soft tissue and there was degeneration and fasciculation of the distal biceps tendon. There was osteophyte formation on the edges of the radial tuberosity. The lump was excised and sent for histopathology, distal biceps tendon debrided, and osteophytes excised.

Histopathological examination of the specimen demonstrated fibro-fatty tissue with synovial layer consistent with bursitis (Figure 5). There were chronic non-specific inflammatory cells but no evidence of calcification or malignant transformation.

Figure 5

Discussion

This is a unique case of a soft tissue growth which has caused long-term symptoms of pain with inconsistent radiological findings for a definitive diagnosis and worsening of symptoms on conservative management. Operative excision and subsequent histology has demonstrated an isolated bursitis with no evidence of malignancy. We conclude that operative management in cases such as this is indicated in order to exclude malignancy.

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Fellowship News

Report of the "SICOT meets SICOT" Fellowship in Székesfehérvár, Hungary

Boney M. Rajan
SICOT Associate Member - Kerala, India

The email from SICOT officials, Prof Jochen Eulert and Dr Hatem Said, confirming my fellowship approval in January 2013, at the St. George County Hospital for Musculoskeletal Disorders and Trauma, Székesfehérvár, Hungary, found me in extreme surprise and joy. Further correspondence with my chief, Prof Laszlo Bucsi, who was in charge of my training, made my Hungarian experience pleasant, homely and memorable; one to be cherished forever in the pages of my life.

It was on 6 July that I was received at the Budapest Airport by the driver of the St. George Hospital and driven to my Chief Supervisor, Laszlo Bucsi, Head of the Department of Orthopaedics & Trauma, who later introduced me to his dedicated team and staff. After having been introduced to my work schedule and routine for the next couple of weeks of my fellowship, I was able to rest before the very resourceful days ahead. Since my fields of interest are mainly arthroplasty and sports surgery, my OR schedule was adapted so I could be involved more in these procedures. The day used to begin with the daily conference, case discussions, etc., followed by the division of activities. From the very first day, I was scrubbed in as 1st assistant in a primary total hip arthroplasty, had enriching discussions with my colleagues, and by the end of the day went through my observations at the chief's cabin; and I had plenty of literature review from recent publications and journals in the library.

With Dr Geza and his sports surgery team

The surgeries I took part in varied from primary hip and knee arthroplasties to revision reconstructions and arthroscopic multi-ligament repair in knee to shoulder instabilities. Moreover, the pre-operative evaluation, planning of the procedure, discussion of pros and cons allowed a fellow to be prepared and learn for the upcoming days' surgery. Though the procedures were not alienating for me coming from a different continent, the versatility of doing familiar surgeries using different approaches opened blocks in my mind which otherwise I would have stumbled on, when facing them back home alone. The tips and tricks of the trade that I was acquiring while I scrubbed in on all days especially widened my thought process. Eventually, I performed a primary total hip arthroplasty under the supervision of Drs Bucsi and Dobos. Drs Geza, Ignaz, Gabor, Erno, Atilla, Horvath, Schandl also played a pivotal role in my training in the OR procedures, articles and journals, and so on. Dr Mester Sandors, Head of the Trauma Department, was instrumental in involving me with the pelvic and acetabular fracture fixation techniques.

Dr Bucsi flanked by Drs Ignaz, Dobos, Geza and Atilla, the head nurse and physiotherapists

My colleagues never missed an opportunity to show me around calm and peaceful Székesfehérvár, the historic residence of the first kings of Hungary. I also had a memorable wine tasting tour with the young residents in the countryside and a picnic by the scenic lake Balaton and Veszprem with senior colleagues and their families. The capital city, Budapest, is a popular tourist destination of Europe, and I enjoyed a boat trip on the Danube river with its beautiful banks, home to famous landmarks such as the Hungarian Parliament.

With Profs Laszlo Bucsi and Laszlo Hangody at the EFORT Forum, Budapest

I was fortunate enough to attend the Joint Congress of the Hungarian Orthopaedic Association and the Hungarian Trauma Society, along with the EFORT Forum in Budapest from 27 to 29 June. The topic of the Forum was "Periprosthetic Fractures around Total Hip and Total Knee Replacement", where there was an opportunity to exchange ideas and views with eminent surgeons of the region. There were numerous presentations and seminars on many interesting subjects related to contemporary practice. I was also fortunate to meet Prof Laszlo Hangody, organizer of the congress, whose name is very synonymous with the Mosaic chondroplasty technique.

Finally, I had the honour of being a guest at Dr Bucsi's residence for his name day, which was a perfect way to end a great training programme that I had embarked on several weeks before. It ended in a flash and I have to admit I left Székesfehérvár with a heavy heart. I must mention the help received from the nursing staff, physiotherapists and hostel wardens. They looked after me and made sure I was comfortable on a daily basis. My heartfelt gratitude goes to this noble organisation, SICOT, and its Head Office without whom a young surgeon would have difficulties acquiring so much experience and training. Thank you.

Worldwide News

Inadequate 'three-point' proximal fixation predicts failure of the Gamma nail

S. G. F. Abram, T. C. B. Pollard, A. J. M. D. Andrade
Royal Berkshire NHS Foundation Trust, Reading, United Kingdom
Bone Joint J 2013;95-B:825–30.

Comment by Shalin Maheshwari

Abstract

Introduction: Peritrochanteric fractures are commonly seen fractures in the elderly patients. Cephalomedullary nails provide a biomechanical advantage over sliding hip screws for unstable fracture patterns. The importance of the tip–apex distance (TAD) for fixation of the proximal fragment has been documented for both devices. For cephalomedullary nails, 'three-point' proximal fixation may confer additional stability and is one of the design features of the Gamma nail (Stryker, Newbury, United Kingdom). These three points are the cortical contact point of the lag screw at the lateral femoral cortex, the cortical contact point of the nail (or end-cap) at the greater trochanteric cortex, and the TAD of the lag screw. Whereas high TAD has been shown to predict failure rate in cephalomedullary nails, the importance of the other two points of proximal fixation has not yet been demonstrated. We hypothesized that mechanical failure of the Gamma nail was associated with inadequate proximal three-point fixation.

Methods: A consecutive series of 299 Gamma 3 nails (Stryker) implanted in 299 patients over a five-year period between 1 January 2006 and 31 December 2010. A total of 76 patients were excluded leaving a total of 223 patients for inclusion in the study. Post-operatively, all patients were allowed to partially bear weight, building to full weight-bearing over a period of six weeks.

Results: A total of 16 failures were identified at a mean time post-operatively of 15.6 weeks (2 to 70): 12 due to fixation failure, three to nail fractures and one due to nail subsidence.

Summary: Mechanical failure of the Gamma nail in peritrochanteric femoral fractures is rare (< 1%) when three-point proximal fixation is achieved. However, when proximal fixation is inadequate, failure rates increase. The strongest predictor of failure is positioning the lateral end of the lag screw short of the lateral cortex. Adherence to simple technical points minimizes the risk of fixation failure in this vulnerable patient group.

Comment

Peritrochanteric fractures have always fascinated orthopaedic surgeons with regards to choice of implant. They can be difficult to treat but the treatment options and indications are fairly well described in most cases. In a recent Cochrane review, Parker et al (2010) showed higher complication rate associated with cephalomedullary devices and recommended further studies using more contemporary implants. Most biomechanical evaluations of the Gamma nail have focused on the inherent differences between it and a sliding hip screw, particularly with respect to the lever arm on the fracture, cut-out from the head, stress-shielding at the calcar, and dynamic sliding of the lag screw. Abram et al have shown us three precise radiological criteria to aim for when using a cephalomedullary nail to fix a fracture of the proximal femur. Their statistical analysis highlighted that both a tip-apex distance of more than 25mm and the absence of penetration of the lag screw through the lateral cortex were associated with failure. When all three radiological criteria were present, the failure rate was less than 1% and when all three were absent it was 7.2%.

The strengths of this study include the large sample size studied over a five-year period, the reliability of the measurements made and the multivariate analysis, which adjusted for important confounding variables. However, there were few limitations, the authors were unable to accurately account for the grade of operating surgeon, mechanism of injury and not follow up all patients up to radiological union. Also the third criterion of protrusion of the proximal end of the nail through the tip of the greater trochanter did not predict failure significantly. I quote comments of Cyril Mauffrey and Philip Stahel in agreement of our and their experience that radiological finding of a high-riding lag screw can be improved by over-sinking the nail, as there is a natural tendency for the nail to migrate proximally while it is being manipulated to allow insertion of the lag screw. Breaching of the lateral cortex by the distal end of the lag screw should be kept to a minimum to prevent irritation of the ilio-tibial band. Meticulous planning and attention to detail will determine the success or failure of this implant and reflects the operator dependency of this type of surgery. The extra ten minutes needed to perfect the position, accuracy of reduction and length of the lag screw will prove to be beneficial for patients, with a lower rate of failure and revision.

This paper by Abram et al has the potential to change medical practice by drawing the attention of the surgical team to new radiological criteria. Overall it is a good study and I would like to implement three-point proximal fixation in peritrochanteric fractures in my routine practice. However, these results should be corroborated by further larger, multicentric, randomized controlled trials to recommend it strongly as a protocol in radiological assessment of these fractures under treatment and serve as a prognostic value for failure in treatment with gamma nail.

Industry News

- **Karl Storz**

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