CASE REPORT

Total Hip Arthroplasty for Childhood Fused Hip
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ABSTRACT
The conversion of a painless fused hip of a long standing duration to a mobile hip is usually not demanded due to a number of per-operative problems, iatrogenic complications and a high demanding procedure. The conversion is, however, required when a patient develops chronic back pain or a painful pseudoarthrosis of the hip. Conversion due to pseudoarthrosis in a recent fracture through femoral neck of previously fused painless hip has never been reported. We are reporting this unique indication for conversion.


INTRODUCTION
The conversion to total hip arthroplasty (THA) requires a meticulous pre-operative planning to avoid iatrogenic complications like sciatic nerve damage, fracture of trochanter and postoperative infection. Pre-operative workup, therefore, must include X-ray of pelvis in frontal, cross-table lateral and Judet views to identify bone stock, hardware, status of the greater trochanter and to identify anterior or posterior column deficiencies.1 An armamentarium to deal with peroperative complication and the proper choice of implants must be pre-arranged. Howard and others2 recommend a modular prosthesis that allows versatility at surgery. 2 For younger patients without distorted anatomy a resurfacing arthroplasty has been the choice of some investigators.3 The standard posterior approach has been recommended, however, experts may use a direct lateral or a trans-trochanteric approach. The least three indications for a trochanteric osteotomy have been identified as an extensive exposure, decreased incidence of injury to atrophied/weakened abductors and provision of advancement at the end of procedure to improve stability.4 For acetabular component fixation structural grafting is sometimes required. One should be prepared to cement the socket if the shell has < 50% contact with native bone and a constrained liner is frequently required because of insufficient soft tissue tension especially in abductors. Howard recommended slide procedure to relieve tension.2 In case of a bald trochanter and no abductors, the proximal femur can be sewn to the tensor fasciae latae anteriorly and gluteus maximus and ITB posteriorly. With this preparation and planning one can achieve satisfactory results in 70 - 95% and compensate leg lengths to 4 cms.2 The presented case represent one of the unique indications and dealing with pre-operative iatrogenic fracture with a different way.

CASE REPORT
A 43 years old woman reported with a fall on a wet floor. She developed left hip joint pain, unable to bear weight and gross restriction of hip movements for the past 2 months. She had ankylosed left hip since the age of 10 years following tuberculosis in that joint. She had multi-drug-resistant tuberculosis (pulmonary and hip) which had begun at the age of 5 years that lasted till the age of 10 years. For the hip she underwent surgical debridements twice in those 5 years. Resultantly, she developed bony ankylosis of the left hip with 15 cm limb length discrepancy. She got her limb lengthened at the age of 16 and 20 years. Since then she had one inch leg length discrepancy, 25° fixed flexion, 10° internal rotation and 10° adduction deformities and tethered skin on greater trochanter without subcutaneous fat. She had multiple surgical scars in inguinal region and thigh. Besides that she also had lumbar 3rd and 4th vertebral fusion in mild kyphoscoliosis. Two months before the arthroplasty, she fell down and sustained undisplaced fracture in femoral neck of the fused hip, developed non-union at that fracture with severe pain and unable to bear weight (Figure 1 and 2). Her family and socio-economic history were unremarkable.

Following pre-operative planning, counselling, discussing ethical issues, formal informed consent and pre-operative fitness / investigations (which were within normal limits), a conversion of fused hip to THA was performed in August 2010. A hybrid THA (Duralloc - Coril stem, 28 mm modular medium neck cone) through posterior southern approach was performed with an adductor tenotomy before placing the patient in lateral decubitus position. Femoral neck was osteotomised with oscillating saw. Femoral head was removed out.
of acetabulum with the help of skid and curette, the acetabulum was reamed upto 48 mm size and further curettage led to a big defect in posterio-superior acetabulum. The acetabulum was reconstructed with part of removed femoral head fixed with a cancellous screw. A 44 mm cup was fixed with bone cement in 45° vertical and 10° anteverted inclination. Following 8 mm rasp reaming a thin trochanter and femoral shaft was left. A 8 mm cementless stem was press fitted. The cup and stem both were well fitted and fixed. However, during a difficult reduction the greater trochanter with part of postero-lateral wall broke away, although, stem remained too tight in the remaining shaft. The broken greater trochanter and shaft fragment was stabilized with a cerclage wire and an additional buttressing was done with a PHILOS plate. This implant bone construct gave significant stability to THA (Figure 3). Wound was closed with a drain placed in deep submuscular plane. The skin over greater trochanter remained too tight.

During the postoperative period, she was given three drugs antituberculosis therapy for 3 months. Her postoperative recovery was uneventful. Her iatrogenic fracture united in 4 months duration. She was advised to gradually increase weight bearing starting after 5 weeks, however, during that duration, sit in bed side exercises, assisted active exercises were carried out to build-up hip abductors, flexors and quadriceps muscles, with the help of a physiotherapist. She regained good strength and mobility in 5 months and was able to work independently without a stick at 6 months post-operative duration. At one year plus follow-up (Figure 4) she was extremely satisfied due to stable, pain free, mobile hip with a good range of movement at the hip joint, more significantly than she had in past 32 years. She was able to sit in the chair easily and developed significant improvement in lumbar spine movement too.

**DISCUSSION**

The indications for conversion of ankylosed hips are well defined that include, mechanical low back pain, multi-
level arthritic changes seen in the lumbosacral spine, malposition (especially increased abduction), excessive leg length inequality, knee pain/instability, ipsilateral/contralateral knee pain due to excessive abduction malposition of fusion, contralateral hip pain and in less than 10% due to pseudoarthrosis at articular surfaces.\(^4\)\(^5\) However, in this particular case, the indication was the recent development of pseudoarthrosis in fracture through remnant femoral neck of fused hip following a recent trauma. Despite the fact, she was comfortable with malposition fused hip (adduction, external rotation deformity with 2.5 cm shortening) and was reluctant to get THA done as advised by the first author on multiple occasions before she had this trauma. It was a definite indication in her present state of hip with fused lumbar 3 - 4 segment, persistent back pain and pain on contralateral hip. The THA improved her range of motion (ROM) at hip, she regained good enough mobility at spine and got relief of LBP, which she was not expecting. Her walking posture and sitting attitude improved significantly and she was able to use public transport for her job.

Converting a fused hip to THA is not always an easy job. It has a high risk of per-operative and postoperative complications like obturator or femoral artery damage and sciatic nerve injury with retractors and dissection,\(^1\)\(^4\) discomfort at reduction of femoral head after completion of prosthetic fitting like proximal femoral shaft fracture and trochanteric fracture, as has happened in this particular case. The patient and family must also be made aware about per-operative and postoperative complications and the results which may be less than primary THA and they must accept that they may require a walking aid indefinitely post-conversion THA.\(^1\)\(^6\)\(^7\) This will help in building a confidence level in patient and surgeon as well as help to regain lost muscle strength with supervised assistance as in this case, she recovered her iliopsoas and glutei strength in less than 5 months and given-up walking aid within 6 months.

The trochanteric fracture with part of lateral proximal femur in this case was a difficult task to manage. Since proximal femoral locking compression plate (LCP) and its screw were too thick to be accommodated over trochanter with no muscle and fat overlying, simple DCP 3.5 mm or 4.5 mm would not have given the expected stable fixation; hence a PHILOS plate was used to fix trochanteric fracture, along with pre-fixation by an cerclage wire to control shaft fragment to achieve best possible stability. The PHILOS plate though looks odd to be there on femur, helped a lot and gave expected good results in due time. The failure to achieve union of trochanteric osteotomy has been frequently reported to increase risk of dislocation and persistent instability.\(^4\) However, her fracture united in time and she regained good abductor and flexor power after supervised physiotherapy and also she regained more than a centimeter limb lengthening which has been another expectation of the patient with fused hips with short-leg and is generally improved substantially after THA around 4 cms compensation has been reported by Howard.\(^2\)\(^4\)

The failure rate of THA in especially fused hip has been reported to be 23% at 7 years with high rate of liner wear and bone breakdown.\(^8\) However; overall good results depends on several factors including improved surgical method, meticulous release of tight muscles and soft tissues.\(^6\)\(^8\) Joshi reported survival rate of implant as 96.1% at 10 years, 89.9% at 15 years and 72.8% at 20 years.\(^7\) Sinha used metal on metal bearing hip resurfacing in a young patient of 34 years with 3 years old arthrodesed hip with 5 years follow-up and recommend resurfacing when hip anatomy is not severely distorted.\(^9\) The heterotrophic ossification has been reported by few investigators.\(^4\)\(^6\) A similar calcification seen in early postoperative X-ray in the capsular area in this particular case did not progress and did not compromise the result till recent follow-up. However, we gave her indomethacin 150 mg for 3 months, that has also been recommended by Howard too.\(^2\)

### REFERENCES