HIP ARTHRODESIS FOR ARTHRITIC HIP IN CHILDREN AND YOUNG ADULTS

Mohamed Mahran* and Usama Farghaly Omar

Orthopedics and Traumatology Departments, Assuit University School of Medicine, Assuit, Egypt.

ABSTRACT

Background: Arthritic hip in children is a sequel of many hip disorders either being congenital, developmental or traumatic. Several surgical options are present for management. A lot of debate is present for hip arthrodesis vsarthroplasty. Both aim at eliminating pain. Patients and Methods: Prospective follow up of 17 patients (15 males and 2 females) 14 - 19 years old with arthritic hip underwent hip fusion using either Cobra or locked anatomical distal femur plate. Hip was fused in 20-30° flexions with neither rotation nor abduction-adduction. Average at age surgery was 16.5 years. All patients were prevented from weight bearing on affected side for 1.5 months post operatively. Patients were evaluated postoperatively by serial x-rays immediate post-operative, 1.5 months, 3 months, 6 months and 12 months for the first-year then every 6 months starting from second year. Harris Hip Score is used for evaluating pain and hip function preoperative and post-operative at 3 months and 6 months post-operative. Results: The average follow-up was 1.5 years. 88.2 % showed union of hip fusion at 1.5 months while 11.8 % showed delayed union at 2.5 months post-operative. Only one case showed aseptic loosening of the screws at 9 months post-operative and metal removal performed. 76.5% of the cases showed increase in Harris Hip score by24-32. Two cases raised by40 points while remaining 2 cases got15 points improvements. Conclusion: Hip arthrodesis is still a good salvage surgical treatment for different conditions of arthritic hip in children for eliminating pain. It can be converted into Total hip replacement (THR) in late adulthood for possible avoidance of serial replacement revision surgeries due to wear process.

Keywords: Hip arthrodesis, THR, Arthritic hip. Cobra plate.

List of abbreviations:


*Correspondence to: Mohamed Mahran, M.D., Lecturer of Orthopedics, Assiut University Hospitals and School of Medicine, Assiut 71526, Egypt. E-mail: dr_mohamedmahran@yahoo.com.

Conflicts of Interest notification:
No conflicts of interest.
Disclosure:
Nothing to disclose.

INTRODUCTION

Secondary hip arthritis in children is a commonly seen problem that should be well diagnosed and treated. Intolerable hip pain is usually the main complaint that pushes the patient or his parents towards seeking medical advice. Defining underlying cause of this arthritic hip should be put in consideration due to presence of different kinds of pathologies which may affect surgical plan. As in cases of sepsis like tuberculosis or septic hip are considered absolute contraindication for replacement surgery. The main goal of treatment is to eradicate pain either with preservation of movement as in replacement surgery or maintain stable fixed joint as in hip fusion. That’s why controversial issue of hip fusion vsarthroplasty still exists till now. Each of which has its own advantages and drawbacks. High failure rate and higher possibility of revision surgery favors hip fusion over replacement surgery. Careful selection of patient for arthrodesis surgery would include exclusion of lower back, ipsilateral knee and contralateral hip problems. [1]

Hip arthrodesis surgical technique has been modified over years either for approach used or implant used. More improvement of union rate and less complications has achieved with the era of pre-contoured plates.

PATIENTS AND METHODS

In the period between 2011and2014, 15 male and 2 female patients with arthritic hip joint managed by hip arthrodesis using Cobra plate or locked anatomical distal femur plate if Cobra plate isn’t available. This took place in Orthopedic Surgery department at Assuit University Hospital in a prospective way. Hip pain was the main complaint in nearly all cases,
while other complaints as limping and limited range of motion (ROM) were present in 5 cases only. The right side was affected in 10 cases while the left side was affected in 7 cases. Average age at surgery was 16.5 years (ranges from 14 - 19 years). Underlying pathology was Perit's disease in 3 cases, old septic hip in 4 cases, 8 cases from AVN head of femur following fracture neck of femur, 1 case from Slipped Capital Femoral Epiphysis (SCFE) treated with surgical dislocation and one case from neglected DDH. Four patients were presented with associated injuries as fractures (humorous, tibia, radius and ulna) or intra peritoneal collection. The minimum operating time was one hour and maximum time was three hours with mean time 2 hours. All associated fractures were ipsilateral. The minimum follow up period was 1 years and the maximum was 3 years. The mean follow up period was 1.5 years.

SURGICAL APPROACH
Under general or spinal anesthesia, patient is set in lateral decubitus position. Pressure points and the other limb shoulder be well supported. Draping from umbilicus till foot. Lateral Incision is made from tip of iliac crest till mid femur. Then fascia is incised distally in continuity with skin incision while proximally gluteus maximus is split. A self-retaining retractor is inserted. The trochanteric bursa is incised for exposure of the trochanteric surface. Internal rotation of the leg is done for better access of the posterior border of gluteus medius and postero-superior edge of the greater trochanter. Marking the osteotomy site with diathermy from posterosuperior edge of the greater trochanter proximally till posterior border of the vastus lateralis ridge distally. Thereafter, osteotomy is done using bone saw in the plane parallel to external rotators direction. It’s important to start the proximal part of osteotomy 5 mm anterior to the most posterior portion of the gluteus medius muscle to guard against injury of medial circumflex femoral artery branch. At the anterior cortex, using bone saw is stopped and osteotome is used to complete the osteotomy. The greater trochanter is flipped anteriorly and the capsule is identified. Capsulotomy is done in Z shaped manner starting from lesser trochanter till acetabulum. Labrum should be kept under vision during superior capsulotomy. Access for excision of ligamentum teres is done via slight external rotation of femur. Surgical dislocation is done for exposure of hip joint. Femoral head articular cartilage is removed using osteotomestill good bleeding bony surface comes. Acetabulum cartilage is denuded using standard THA reamers till well-bleeding subchondral bone. The hip is then positioned in 20-30° flexion with neither rotation nor abduction-adduction. Holding the hip in this position with positioners. Cobra or locked anatomical distal femur plate is inserted. Greater trochanter is resected to its origin and fixed with two partially threaded cancellous screws and washers. Good closure of all muscles and capsule is done, followed by closure of iliotibial band. Finally, subcutaneous and skin are closed and sterile dressing is applied.

RESULTS
All patients underwent fusion of the affected hip joint using Cobra plate in 14 patients. Locked anatomical distal femur plate was used in 3 cases as shown in figure 1(a & b). Hip was fused in 20-30° flexions with neither rotation nor abduction-adduction positioning. Limb length discrepancy (LLD) ranged from 1.5 - 2 cm immediately post-operative, while at last follow up LLD ranged from 1.2 – 1.7 cm which is well tolerated by patients. All cases were followed radiological and clinical pre-and post-operative. All cases were prevented from weight bearing on operated side for 1.5 months post-operative except for 2 cases who showed delayed union and weight bearing was postponed till union occurred at 2.5 months. Skin wounds were closed by staples which were removed at 21 days post-operative. No cases showed wound dehiscence. Only one case showed aseptic loosening of screws at 9th month post-operative so metal removal was done. Harris Hip Score was compared pre-and post-operative which showed the following differences in table 1.
Figure 1:
- (a) preoperative x-ray of male patient 19 years old with arthritic left hip due to Perth's disease.
- (b) 1.5 months post-operative x-ray showing left fused left hip using contoured locked distal femur plate.

Table 1: Pre-and 6 months post-operative Harris Hip Score.

<table>
<thead>
<tr>
<th>Case</th>
<th>Harris Hip score pre-operative</th>
<th>Harris Hip Score post-operative at 6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>55</td>
<td>78</td>
</tr>
<tr>
<td>Case 2</td>
<td>60</td>
<td>86</td>
</tr>
<tr>
<td>Case 3</td>
<td>32</td>
<td>72</td>
</tr>
<tr>
<td>Case 4</td>
<td>45</td>
<td>77</td>
</tr>
<tr>
<td>Case 5</td>
<td>62</td>
<td>77</td>
</tr>
<tr>
<td>Case 6</td>
<td>54</td>
<td>79</td>
</tr>
<tr>
<td>Case 7</td>
<td>65</td>
<td>80</td>
</tr>
<tr>
<td>Case 8</td>
<td>53</td>
<td>79</td>
</tr>
<tr>
<td>Case 9</td>
<td>45</td>
<td>76</td>
</tr>
<tr>
<td>Case 10</td>
<td>49</td>
<td>79</td>
</tr>
<tr>
<td>Case 11</td>
<td>52</td>
<td>76</td>
</tr>
<tr>
<td>Case 12</td>
<td>50</td>
<td>75</td>
</tr>
<tr>
<td>Case 13</td>
<td>44</td>
<td>73</td>
</tr>
<tr>
<td>Case 14</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>Case 15</td>
<td>45</td>
<td>77</td>
</tr>
<tr>
<td>Case 16</td>
<td>58</td>
<td>83</td>
</tr>
<tr>
<td>Case 17</td>
<td>48</td>
<td>72</td>
</tr>
</tbody>
</table>

DISCUSSION

Pain, limping and limited ROM secondary to hip pathology are important factors that affects patients' life and daily activities. Reaching painless and stable joint is aim of the surgery. Despite, arthroplasty remains the gold standard treatment in late adulthood and old age, but wear process and the need for several revision surgeries limit their use in children and young adults. In our study, hip arthrodesis was performed for 17 cases with arthritic hips and resulted in elimination of pain, stable joint. Although, there's LLD, it is tolerated by patient and he can perform his daily activities again. At start some activities were done with difficulty specially those related to wearing socks or tying shoes, but improvement occurred with further rehabilitation and physiotherapy. Further conversion into THR is still favorable at later age.

Banskota et al, reviewed 28 patients who underwent hip fusion showed that hip fusion in children is a good option for those case. It's suitable for high demand active patients and also socioeconomically much cheaper than arthroplasty. [4]

Callaghan et al, eight out of 28 patients were satisfied with hip fusion, 2 patients regretted doing fusion and wished that they had done THR, 17 patients couldn’t decide and one patient didn’t understand when they all had asked if they’re happy with arthrodesis or they wished to do THR. [5]

Despite that hip fusion gives high union rates and improves patients’ quality of life, of union allowing, developed back and ipsilateral knee pain due to abnormal hip biomechanics drives the patient to seek his surgeon for later on THR. [6]

Paul E. Beaulé stated that hip fusion is a good surgical option in children specially with presence of underlying infection and provides good bone stock if further conversion to THR is needed. [1]
With more optimal leg alignment during fusion, less pain from neighboring joints and better life quality could be achieved. [7]

Low back pain, excessive LLD, ipsilateral knee pain and contralateral hip pain are the main indication for converting fused hip into THR. Pre-and postoperative complication of this conversion should be well explained to patient and his family. [8]

Villanueva et al, compared in his study between converting spontaneous fused hip and surgical induced fusion to THR. Patients with surgical arthrodesis showed better improvement after conversion to THR. Abductor muscle state is one of the prognostic factors that could affect functional outcomeafter conversion into THR. Those muscle groups are more affected by surgical arthrodesis rather than spontaneously induced fusion. [9]

Higher risk of complications during converting fused hip into THR should be taken in consideration as intraoperative fracture and neurovascular injury. Lengthening for correcting LLD shouldn’t exceed 4 cm as this may result in injury of sciatic nerve. Patients with bilateral hip fusion and females with hip fusion aiming at normal sexual life are among highest indication for conversion into THR. [10]

CONCLUSION

Hip arthrodesis is considered as a great palliative operative treatment for secondary arthritic hip problems in children and young adults. It eliminates pain, maintain stable joint and improves quality of life. Complications as LLD, low back and knee pain could be avoided by good positioning of fused joint. Later on, conversion into THR is still can be performed in late adulthood specially with using trochanteric flip osteotomy.

FUNDING

No fund or grant was used to conduct this study.

REFERENCES


سمكرة مفصل الحوض في حالات خشونة مفصل الحوض في الأطفال واليافعين

محمد مهران وسامح فرغلي عمر
قسم جراحة العظام - كلية الطب - جامعة أسيوط

تُعتبر حالات خشونة مفصل الحوض في الأطفال من الحالات الشائعة والتي تحدث نتيجة عدة أسباب مثل عيوب خلقية أو امراض مكتسبة أو في حالات إصابات وكسور مفصل الحق وعظمة الفخذ. وهناك عدة طرق لعلاج هذه الحالات مثل سمكرة مفصل الحوض أو استبدال مفصل الحوض بمفصل صناعي كامل.

في هذه الدراسة قمنا بمتابعة 17 حالة من المرضى الذين تعانيون من خشونة مفصل الحوض وقمنا بإجراء سمكرة لمفصل الحوض في هذه الحالات باستخدام شريحة كوبيرا أو شريحة أسفل عظمة الفخذ التشريحي المعشبة ذاتيا. استمرت الدراسة على 15 مريض ذكر و2 مريض من الإناث. تراوحت أعمار المرضى من 19-14 عام. متوسط مدة متابعة الحالات سنتين ونصف. 88.2% من الحالات أظهروا تحسنًا بعد شهر ونصف من إجراء الجراحة. بينما 11.8% من الحالات أظهروا التحسن كامل بعد شهرين نصف من إجراء الجراحة.

سمكرة مفصل الحوض يعتبر من أحدث الطرق الناجحة في علاج خشونة مفصل الحوض في الأطفال واليافعين. حيث أنه يقضي على التصاق مفصل الحوض الناجم عن الإصابة. كما أنه يمكن أن يساعد في القيام بأنشطة اليومية دون تحد أو مشكلة. بالإضافة إلى أنه يمكن إجراء استبدال هذا المفصل بمفصل صناعي كامل في وقت لاحق.