Subsartorial Approach in Open Reduction of Developmental Dysplasia of Hip


The Department of Orthopaedic Surgery, Al-Helal Hospital* and Faculty of Medicine, Cairo University**

Abstract

Introduction: The ultimate aim of treatment of DDH is to obtain a stable concentric reduction at the earliest possible age. This however must not be achieved at the expense of inducing avascular necrosis in the femoral head, which clearly is the main risk factor of intervention.

Aim of the Work: To discuss the results of open reduction in cases of developmental dysplasia of hip using a new approach called subsartorial approach.

Patients and Methods: The study was performed on 17 cases (20 hips with DDH), all cases were surgically managed by open reduction of hip joint through subsartorial approach.

Results: All the patients were followed up clinically with the modified McKay criteria and radiologically by the Severin's radiological grading.

Conclusion: Subsartorial approach is a reliable approach for open reduction in DDH cases that are below 2 years with neither history of pervious operation in their hips nor history of paralytic dislocation.

Key Words: Subsartorial – Developmental dysplasia of hip – Open reduction.

Introduction

DEVELOPMENTAL Dysplasia of the Hip (DDH) denotes a wide spectrum of pathologic conditions, ranging from subtle acetabular dysplasia to irreducible hip dislocation. When DDH is recognized in the first 6 months of life, treatment with a Pavlik harness frequently results in an excellent outcome. In children older than 6 months, achieving a concentrically reduced hip while minimizing complications is more challenging. Bracing, traction, closed reduction, open reduction, and femoral or pelvic osteotomies are frequently used treatment modalities for children aged 6 months to 4 years [1].

Although most often considered for children older than 18 months, an open reduction is indicated for any hip in which a concentric, stable reduction cannot be achieved by closed means. A variety of approaches may be used; the location of the skin incision is of less importance than the elements of the procedure relevant to the acetabulum. The modified Smith-Petersen anterolateral approach, performed via a “bikini” incision, is the most utilitarian approach and is used when there is the possibility of a concomitant pelvic osteotomy. This approach is particularly well suited to open reduction in patients in whom there may be a high-riding femur with a lax capsule adherent to a false acetabulum structures that are not as well visualized through a medial approach. The disadvantages of this approach may include greater blood loss than with the various medial and anteromedial approaches, possible damage to the iliac crest apophysis and the hip abductors, and postoperative stiffness. If this approach is used in bilateral cases, the procedures are usually staged at 2-to 6-week intervals [1].

Inability to perform a pelvic osteotomy or capsulorrhaphy via a medial approach generally limits its use to patients less than 12 to 18 months of age. However, a medial approach requires minimal dissection, avoids splitting the iliac apophysis, and allows direct access to the medial structures. There are several medially based approaches. The true medial approach, as originally described by Ludloff [2] utilizes the interval between the pectineus and the adductor longus and brevis. Ferguson [3] popularized the use of this approach in the
United States and modified it to pass between the adductor longus and brevis anteriorly and the adductor magnus and gracilis posteriorly. Weinstein and Ponseti [4] have described an anteromedial approach that passes between the neurovascular bundle and the pectineus muscle. A medial approach potentially endangers the blood supply to the femoral head, and several authors have noted an association between use of the medial approach and increased rates of osteonecrosis. Although the incidence of osteonecrosis has been reported to be as high as 43% at a mean follow-up interval of nearly 10 years, this has not been substantiated. Nevertheless, concern regarding increased rates of osteonecrosis has contributed to the decreased popularity of this approach. More important, the completeness of the removal of obstacles to reduction affects the outcome [1].

Patients and Methods

In the period between Jan. 2012 to September 2013, a prospective study was conducted involving 17 cases (20 hips) with DDH. All patients were operated at new Pediatric Hospital in Cairo University and Al-Helal Hospital. All cases were surgically managed by open reduction of hip joint through subsartorial approach to the hip. Inclusion criteria; child (9-24) months old with developmental dysplasia of hip, exclusion criteria; child more than 24 months old, Relapsed or recurrent DDH, previous operation in the same hip, teratological dislocation and idiopathic dislocation.

Surgical technique and postoperative treatment:
All patients were operated upon under general anesthesia, in supine position and under C-arm control. 1cm distal and medial to Anterior Superior Iliac Spine (ASIS) and extending to about 7cm parallel to inguinal ligament, disinserting of sartorius origin from iliac apophysis. Protecting the lateral femoral cutaneous nerve, cutting rectus femoris from Anterior Inferior Iliac Spine (AIIS), and perform a recession tenotomy to psoas tendon. Make a T-shaped incision of the capsule, detach the ligamentum teres, remove pulvinar in the true acetabulum, reduce the femoral head, and close the capsule, suturing the lateral flap of the T-shaped incision as far medially as possible to eliminate any redundant capsule, suture the rectus femoris tendon to its origin and detached sartorius is reattached to the iliac apophysis, close the superficial fascial layers, the subcutaneous tissues, and the skin. Apply a double hip spica cast with the hips in 100 degrees of flexion and 40 to 55 degrees of abduction.

Fig. (1): A- Skin incision 1cm distal and medial to Anterior Superior Iliac Spine (ASIS) and extending to about 7cm parallel to inguinal ligament.
B- Identification of iliopsoas tendon.
C- T shape incision in hip capsule.
D- Closure of capsule.
Clinical and radiological evaluation, all patients had clinical evaluation at (immediately postoperatively, 2 weeks, 3 months, 6 months and 12 month). The McKay score was used to assess hip clinically at 12 months. Radiological evaluation by severin [8] score 12 months after surgery. Acetabular index was measured preoperative and 12 months postoperative.

Results

The mean age of included patients was 16.5 ± 7.5 months (range: 9 moths-24 months). Of the included 17 patients (20 hips), 4 hips (20%) were males, while 16 hips (80%) were females, 13 patient was left side DDH, 4 were right sided and 3 patient were bilateral. The mean length of follow-up was 12 months post surgery (range 10-14). At final follow-up, clinically all of the hips were normal, even those discussed below with evidence of vascular insult. Radiologically according to Severin score 9 hips were excellent (Severin class I), 10 hips were good (Severin class II) and one hip was fair (Severin class III). Clinical evaluation according to McKay criteria fifteen of the hips achieved an excellent and five were good.

There was evidence of a vascular insult post operatively in one hip. These were classified as Group I according to the Kalmachi and MacEwan [6] classification. The ossific nucleus was present in this case. Two hips had a proximal femoral osteotomy performed for lateral subluxation at three months later.

Table (1): Summary of results.

<table>
<thead>
<tr>
<th>Clinical outcome modified McKay criteria</th>
<th>Radiological outcome by Severin [8] score</th>
<th>Acetabular Index (AI)</th>
<th>Complication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent: 15 hips [75%]</td>
<td>Type I (excellent):</td>
<td>Mean preoperative (AI): 40.78±3.96</td>
<td>• One hip developed (AVN) Group I according to the Kalmachi and MacEwan [6] classification.</td>
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<tr>
<td>- 9 hips [45%]</td>
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<td></td>
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<tr>
<td>Good: 5 hips [25%]</td>
<td>Type II (good):</td>
<td>Mean 1 year post-operative (AI): 26±3.30</td>
<td>• Two hips had a proximal femoral osteotomy performed for lateral subluxation at three months later.</td>
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<tr>
<td>- 10 hips [50%]</td>
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<tr>
<td></td>
<td>Type III (fair):</td>
<td></td>
<td>• One patient developed a minor superficial wound infection which cleared with oral antibiotics.</td>
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<td>- 1 hip [5%]</td>
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</table>

Discussion

The most important complications seen during treatment of DDH are subluxation, redislocation and AVN. Many studies related to complications have been cited. Kiely et al., [7] evaluated 49 hips they operated using a medial approach in patients with ages ranging between 6 months and 23 months. According to the Severin classification, they obtained radiologically excellent and good results in 92% of their cases. Ucar et al., [8] achieved radiologically excellent and good results in 79% of their cases (44 hips) aged between 2 months and 19 months, using open reduction with a medial approach. Mehmet et al., [9] operated 13 cases by anterior approach; mean age of all the patients operated by was 21.77 ± 1.42 (range 20-24 months) months. According to the McKay classification, type I and II outcomes were achieved in 12 of 13 cases (92.3%). Based on the Severin radiological classification, type I and II outcomes were achieved in 11 (84.6%) cases [9].

In our study we operated 17 patients (20 hips), we obtained radiologically excellent and good results in 19 (95%) of our patients according to the Severin classification. Clinically we obtained excellent in 15 (75%) hips and good in 5 (25%) hips according to McKay criteria. In our new subsartorial direct approach to hip we take the benefit of smith Peterson, which are easy accessibility to capsule, ligamentum teres and pulvinar. We can do capsulorraphy without obstacles. Also we avoid hazards of smith Peterson approach and its bikini incision by avoiding extending the wound on the iliac apophysis so we decrease blood loss, protecting iliac apophysis, leaves small more cosmetic scar.

Conclusion:

Subsartorial approach has a small incision, there is much little amount of blood loss, and no need for blood transfusion and its hazards. Subsartorial approach avoids apophseal splitting. Subsartorial approach avoids higher rate of avascular
necrosis of femoral head results from medial approach. Subsartorial approach allows surgeon to do appropriate capsulorrhaphy which is unfeasible in medial approach. Subsartorial approach leaves small cosmetic scar. Subsartorial approach is reasonable and reliable approach to pediatric hip who are below 2 years with neither history of pervious operation in their hips nor history of paralytic dislocation, we recommend this approach for trained surgeons who are familiar with paediatric hip surgeries.

References


الملخص العربي

بعد مراس خلع مفصل الورك من أكثر أمراض الأطفال الخلقية انتشاراً فإن يكون أكثرها قاتلاً. وبدلاً من عام 2999 غيرت الجمعية الأمريكية لجراحة الأطفال توصية من مراس خلع الورك إلى مراس «نحو» حيث ينشأ من اختلاف التدفق النمو المو ستعمل الفخذ وتكوين الحص في الجين في الثلاثة أشهر الأخيرة من الحمل نتيجة عامل الضغط الذي قد يؤثر على انفراج فخذين الجنين وهو الأمر الذي يكشف الأنساخ داخل الحديقة وبالتالي نموهما معًا طبيعياً.

عادة ما يتمعلاج الخلع وفقًا لسن الطفل وذلك أربع مراحل زمنية. الأولى منها تكون عندما يتم اكتشاف خلع الورك أو الإسقاء بخلع الورك في الشهر الأول يتم تقدير الأم وضع اجتماع إضافية وضع جهاز خلع الورك. أما المرحلة الثالثة: ما بين سنتين إلى خمس سنوات. يثير الشعور الأولي الذي يتم تشخيصه بعد شهر السايس حيث يتم عملية إدخال الطب إلى غرفة العمليات حيث يتم تشخيصه العام يتم وضع مفصل الورك الشكل مع إمكانية قطع الأوتار المقربة لمفصل الورك وإذا لم ينجح يتم عمل مفصل خلع الورك لإزالة أزمة الورك أو مع تم تركيب ببطانة جبس لمدة عشرة أسابيع تقريبًا حيث يتم بعدها إزالة الجبس وتتابع الطب بواسطة جهاز خلع الورك والتأكيد من أن حركة الفخذ مع تشخيص النح يبدأ بالتمارين. وفي هذه المرحلة تكون النتائج ليست بالجودة للمراحل الأولي والثانية ومن ثم فصل الأوتار المقربة لمفصل الورك وعملية الرقمية. ويتم فصل المفصل مع احتفالية قص دوري يتراقب عليه جسم ثلاثة أشهر ثم فك الجبس. وفي المرحلة الرابعة هي أن يتم علاج الطفل بعد السنة الثالثة فهناك لابد من عمل فصل لأسفل عظم الفخذ وتشخيص عظم الفخذ.

يوجد نهجًا للزمن المفتوح لمفصل الفخذ الأمامي والأداخلي أما النهج الأمامي أو «سميد بيترسون» (ويعد أشهر نهج لمفصل الفخذ عند الأطفال) ويتميز بوجود حلول زوايا مع إمكانية عمل شف عزمي للحوض من خلال نفس النهج، ويجب تشخيص مركز المع阳光 إلاه ويزيد من النسبة المئوية بالنظام داخل والذي يتميز بقلة التفاس مع إمكانية النهج لمفصل الفخذ في نفس الوقت ويجب عدم وضوح حقل الرؤية بالمقارنة بالنهج الأمامي كما يجب أيضاً زيادة نسبة ضمور أسفل عظم الفخذ بعد الجراحة.

نناقش في هذا البحث نهج جديد لمفصل الفخذ عند الأطفال وهو نهج تحت قسطة الخياطة ويتميز بسهولة جرح، عدم تش Berk مركز المع阳光 الإلي، ووضوح حلول زواياه، قابلة للنفاذ والغطاء عظم الفخذ بعد الجراحة.

النتيجة:

1. نهج تحت لوة الخياطة هو طريق مباشر لوصول لمفصل الفخذ.
2. نهج تحت لوة الخياطة يتجنب فصل مركز المع阳光 الإلي.
3. نهج تحت لوة الخياطة يتجنب النسبة العالية لضمور أسفل عظم الفخذ.
4. نهج تحت لوة الخياطة يسبح بروز واضح للقطع المفصل بما يلي راحة بسهولة.
5. نهج تحت لوة الخياطة متاسب للأطفال تحت سنين دون أي تاريخ لأمراض عصبية ونتائج الأكليكية ممتازة وجوده.
6. نهج تحت لوة الخياطة يترك فيه صغيره بالمقارنة بالنهج الأمامي.
7. نقصيه للاجحرين المتمردين الذين لهم خبرة بجراحات مفصل الفخذ.