



Total hip arthroplasty in patients with osteoarthritis secondary to developmental dysplasia of the hip: results after a mean of eight-year follow-up

Gelişimsel kalça displazisi zemininde gelişen osteoartritli hastalarda total kalça artroplastisinin ortalama sekiz yıllık sonuçları

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Amaç: Gelişimsel kalça displazisi ya da ağır displazi zemininde gelişen osteoartritli hastalarda total kalça artroplastisinin ortalama sekiz yıllık sonuçları değerlendirildi.

Çalışma planı: Gelişimsel kalça displazisine bağlı osteoartritli olan 29 hastanın (25 kadın, 4 erkek; ort. yaş 54; dağılım 35-78) 31 kalçasına total kalça artroplastisi uygulandı. Hartofilakidis ve ark.nın sınıflamasına göre, 13 kalça tip 1, 13 kalça tip 2, beş kalça tip 3 olarak değerlendirildi. Bütün olgularda asetabuler komponent gerçek asetabulumuna yerleştirildi. Altı kalçada hibrid, 25 kalçada çimentosuz protez uygulandı. Asetabuler yetmezliği olan sekiz olguda otojen kemik grefti ile destekleme yapıldı. Yedi olguda yumuşak doku gevşetmeleri uygulandı. Yüksek kalça çıkıklarında femoral kısaltma osteotomisi uygulandı. Hastalar Merle d'Aubigne ve Harris kalça skorları ile değerlendirildi. Ortalama takip süresi sekiz yıldır (dağılım 1-10 yıl).

Sonuçlar: Ameliyat öncesi ve sonrası Merle d'Aubigne ve Harris kalça skorları karşılaştırıldığında, sonuçlar sekiz kalçada (%25.8) çok iyi, 17'sinde (%54.8) iyi, beşinde (%16.1) orta, birinde (%3.2) kötü bulundu. Ekstremiteler arası boy farkı ortalama 1.7 cm (dağılım 0.5-2.5 cm) idi. Komplikasyon olarak bir olguda greftin kaynamaması, iki olguda da yüzeysel yara enfeksiyonu görüldü. Hiçbir hastada nörolojik komplikasyon gelişmedi. Takiplerde iki olguda asetabuler komponentte, bir olguda femoral komponentte gevşeme görüldü. Bu olgulara revizyon uygulandı.

Çıkarımlar: Gelişimsel kalça displazisine bağlı osteoartritte iyi planlama ve uygun ameliyat ile iyi sonuçlar elde edilebilir.

Anahtar sözcükler: Artroplasti, replasman, kalça; kalça çıkığı, doğuştan/cerrahi; osteoartrit, kalça.

Objectives: We evaluated eight-year results of total hip arthroplasty in patients with osteoarthritis secondary to developmental dysplasia of the hip (DDH).

Methods: Total hip arthroplasty was performed in 31 hips of 29 patients (25 females, 4 males; mean age 54 years; range 35 to 78 years) with osteoarthritis secondary to DDH. According to the classification by Hartofilakidis et al., there were 13 type 1 hips, 13 type 2 hips, and five type 3 hips. The acetabular component was placed in the true acetabulum in all the hips. Hybrid and uncemented prostheses were used in six hips and 25 hips, respectively. Eight patients with severe acetabular deficiency required augmentation with an autogenous bone graft. Soft-tissue releases were performed in seven hips. Femoral shortening osteotomy was performed for high hip dislocations. All the patients were evaluated using the Merle d'Aubigne and Harris hip scores. The mean follow-up period was eight years (range 1 to 10 years).

Results: According to the postoperative Merle d'Aubigne and Harris hip scores, the results were excellent in eight hips (25.8%), good in 17 hips (54.8%), fair in five hips (16.1%), and poor in one hip (3.2%). The mean length discrepancy between the two extremities was 1.7 cm (range 0.5 to 2.5 cm). Complications included nonunion of the acetabular graft in one patient and superficial wound infection in two patients. Neurologic complications did not occur. Three patients required revision for loosening of the acetabular (n=2) or femoral (n=1) components.

Conclusion: Successful results can be obtained with good planning and proper surgical procedures in the treatment of osteoarthritis secondary to DDH.

Key words: Arthroplasty, replacement, hip; hip dislocation, congenital/surgery; osteoarthritis, hip.

Treatment with total Hip Arthroplasty of the osteoarthritis which is the result of developmental dysplasia of hip gives successful results; although has specific problems such as; uncovered acetabulum, differences of anatomy of proximal acetabulum, abnormal hip rotation center, differences of extremity length, abductor muscle insufficiency, changes of neurovascular structure anatomy and muscle contractures.^[1,2] The most common problem from these is insufficient acetabular coverage which threatens component fixation.^[3,4] Eftekar.

As Eftekar implicated in his book at 1993 total hip arthroplasty for the developmental dysplastic hips contra-indicated due to technical difficulties and high complication rate in those years.^[5] Success rate was increased with techniques such as femoral shortening,^[6] small component usage for increasing acetabular coverage,^[7,2] medialization of acetabulum with performing fractures on acetabulum,^[3,8] grafts from femoral head or allograft usage for support to the acetabular component.^[9] For femoral side is cementing or uncement, osteotomy type argument is going on, although Paavilainen^[10] notifies successful results in his large series which they had used osteotomy for femoral shortening. On acetabular side Mulroy and Harris^[11] reports on their long term followup %46 acetabular loosening due graft resorption, also in these days puts on argument for the life of graft. Sağlam et al^[12] had successful results for developmental dysplastic hips which they had made arthroplasty in the mean time 54.7 months.

Material and methods

31 hips of 29 patients with developmental dysplastic hips who had total hip arthroplasty between January 1994 and January 2004 retrospectively held in this study. 13 of those hips were Hartofilakidis^[8] type I, 13 type II and five were type III. Average ages were 54 (35-78) and 25 of them women and four were men. Mean followups were 8 (1-10) years.

All prosthesis acetabular components were located in the real acetabulum not in the neocotile. We took care for protecting bone block between acetabular walls and medialization during reaming. Total eight otogenous femoral head were used as bone graft for acetabular roof in three type 2 patients and two for type 3 patients. Soft tissue release were done in seven patients. For four patients subtrochanteric

shortening osteotomy was performed by transverse or oblique osteotomy and proximally supported femoral components were used. 25 uncemented and six hybrid prosthesis were used. Patient age, bone quality, congruence and medullar index were used. Uncemented prosthesis used for young and medullar index 3-4 patients.

Clinical evaluation is based on followups before and after operation. Merle d'Aubigne and Harris hip scores,^[5] pre and postoperative scores were compared, radiologic evaluation based on acetabular and femoral component migration, inclination angle differences, acetabular graft and femoral osteotomy union, heterotopic ossification formation and progressing radiolucent line for Charnley ve Gruen zones on X-rays before and after the operation. Also length differences and Trendelenburg test signs were evaluated. All operations had been done with supine positioning and anterolateral exposure. Acetabular components were placed at true acetabulum in all cases. Structural autografts (from the femoral head) were used for cases which acetabular coverage were less than %70. Structural autografts were prepared to adapt the defect and graft surface and fixation was supplied with two screws.

Soft tissue releases like capsular resection (routine for type 3, for type 2 patients which hard exposure two real acetabulum in the operation.), iliopsoas, adductor tendon tenotomies, releasing gluteus maximus from the linea aspera were done when needed. Oblique or transverse subtrochanteric osteotomy were done and fixation was done with cerclage wires over the plate for insufficient cases.

Rehabilitation was begun on the third operative day. Partially weight bearing was let for first eight weeks and after three months gradually reached to full weight bearing for uncemented cases. Early full weight bearing for hybrid (femur cemented, acetabulum porous coated, uncemented and according to stabilization fixation was done with two screws.) was let. This protocol was used for whole patients, during this protocol little changes was performed. This period was performed by increasing this time by 1-2 months for cases which acetabular grafting and femoral shortening was done. Low dose heparine profilaxy was performed for all cases for 10 days.

Results

Result of clinical evaluation which is based on followups pre and post- operation Merle d'Aubigne and Harris hip scores,^[5] before and after scores were perfect in eight (%26) hips, good in 17 (%55), fair in five (%16) and bad in one (%3).

Nonprogressive radiolucent line was seen for three cases on zone1, one in zone2 according to Charnley ve Gruen zones during radiologic assessment. Revision done in one case because of graft nonunion. Vertical migration was seen on acetabular components at early periods, but in any of them no loosening had seen on follow ups.

Trelendenburg test was positive for seven (%22) hips on last follow ups. Extremity length differences was 1.7 (distribution 0.5-2.5). About complication. graft nonunion was one and two superficial infection was seen. None of them had neurologic complication, we think this related to appropriate osteotomies which had been done for needful cases. During follow ups loosening was assigned at two patients on acetabular components and at one patients on femoral component. Revision had been done for these cases.

Discussion

Although oneness has reached about endications and techniques for therapy with total hip arthroplasty for patients who has idiopathic hip osteoarthritis, problems and discussions is going on about total hip

arthroplasty for dysplastic or dislocated hips. Also the other important point is demanding arthroplasty for these patients is the early ages, in the early fifties.^[13]

On three important points there are difficulties for therapy of Osteoarthritis which is the result of developmental dysplasia of hip with total hip arthroplasty are.; acetabular reconstruction, preperation of femoral canale, component reduction and difficulties during correction of extremity differencies.^[14]

Owing to lots of reasons we believe that acetabular component must set down to true site like most outhors.^[14,15] First one is, at false acetabulum for body weight lever arm longer then abductor lever arm so over weight for the hip is mounted. Second is, at false acetabular level shearing forces affecting to acetabular component results early loosening. Third bone stock at true acetabulum is better then proximal levels. The last one is higher acetabulum brings consistent abductor insufficiency, limping and extremity inequality Although it is pretty hard to provide sufficient coverage of acetabular component at true site. Erdemli et al. recommends both placing the cup in the true acetabulum to maximize host-bone contact with the implant and preserve as much host bone as possible.^[16]

Anderson ve Harris^[1] performed a prospective study of a consecutive series of twenty-one patients (twenty-four hips) who had uncemented acetabular component at eight year follow up found no loosening, migration and %70 coverage is enough for sta-



Figure 1. 56 female patient (a) preoperative (b) postoperative, (c) three year follow up x rays.

bility and there is no need to structural grafting. Lök et al.^[15] advocate femoral head autografts increases acetabular component stability in their cases. although it's not routinely suggested, there is lots of papers about acetabular roof suportage with structural grafts from femoral head and all these graft had united^[17,18,19,12] Our study results qualitatively supports this.

Gill et. al.^[20] recommend placing acetabulum to original place and usage of acetabular reinforcement ring to provide enough coverage and long time stabilization. Also various medialization techniques was described for shallow acetabulum reconstruction. The first one is protrusio socket technique which was defined by Dunn Hess.^[4] Hartofilakidis et. al.^[13] had made the other medialization technique which is called Stamos cotiloplasty by reaming medial wall and without using wire cage. In recent years Dorr et.al.^[3] performed medialization with porous coated and screw pressfit component and without using structural graft. In our study grafts which we had transferred to acetabulum excluding one all of the grafts from femoral head had united., so we recommend usage of this graft method when needed.

During preperation of femoral canale extra care mustbe taken and controlled reaming must hold with hand during reaming process due very thin femoral cortex and medulla is narrow. Extreme anteversion, varus and valgus position must be avoided when placing femoral component. Hartofilakidis et al.^[13] proposed cemented component is better because with uncemented component, its very hard to achieve good begining stability and enough biologic fixation due to thin cortex and narrow medulla somedullar canale must fulfilled in best way. According to our experience that with thin cement covered femoral component loosening risk is high especially for young and active patients in which subtrocanteric osteotomy had been done. Component reduction generally hard to achieve.

Shortening must be done to avoid neurovascular complications although soft tissue releases reduction can't be done.

As a result total Hip Artroplasty therapy of Osteoarthritis which is the result of developmental dysplasia of hip is a succesfull method; although it has tehcnical difficulties and high complication rate.

With appropriate and succesfull surgery diminishes pain and increases life quality of these patients. İmproving technical modifications can increases success.

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