International Journal of Surgery Case Reports 5 (2014) 155–158

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Idiopathic hypertonicity as a cause of stiffness after surgery for developmental dysplasia of the hip

Turgut Akgül*, Süleyman Bora Göksan[1], İlker Eren[1]

İstanbul University, İstanbul Medicine Faculty, Orthopaedics and Traumatology Department, Millet caddesi. Çapa, Fatih, İstanbul, Turkey

ARTICLE INFO

Article history:
Received 11 December 2013
Received in revised form
28 December 2013
Accepted 19 January 2014
Available online 27 January 2014

Keywords:
Idiopathic hypertonicity
Hip stiffness
Hip dysplasia

ABSTRACT

INTRODUCTION: There are various complications reported with surgical treatment of DDH. Most studied complication is avascular necrosis of the femoral head and hip stiffness. The purpose of this report was to describe a case with severe stiffness of the hip due to hypertonicity in periarticular muscles after it was treated for developmental dysplasia of the hip (DDH).
PRESENTATION OF CASE: Three-year-old patient referred to our institution with bilateral DDH. Two hips were operated separately in one year with anterior open reduction, femoral shortening osteotomy. Third month after last surgery, limited right hip range of motion and limb length discrepency identified. Clinical examination revealed that patient had limited range of motion (ROM) in the right hip and compensated this with pelvis obliquity. Gluteus medius, sartorius and iliofemoral band release performed after examination under general anesthesia. Symptoms were persisted at 3rd week control and examination of the patient in general anesthesia revealed full ROM without increased tension. For the identified hypertonicity, ultrasound guided 100 IU botulinum toxin A injection performed to abductor group and iliopsoas muscles. Fifth month later, no flexor or abductor tension observed, and there was no pelvic obliquity.
DISCUSSION: Stiffness as a complication is rare and is usually resolved without treatment or simple physical therapy. Usually it is related with immobilization or surgery associated joint contracture, and spontaneous recovery reported. Presented case is diagnosed as hip stiffness due to underlying local hypertonicity. That is resolved with anesthesia and it was treated after using botulinum toxin A injection.
CONCLUSION: Hypertonicity with hip stiffness after surgical treatment of DDH differ from spontaneous recovering hip range of motion limitation and treatment can only be achieved by reduction of the muscle hypertonicity by neuromuscular junction blockage.

1. Introduction

The goals in the treatment of children with developmental dysplasia of the hip (DDH) are concentric reduction and maintenance of the reduction in order to provide the optimum environment for the development of femoral head and acetabulum.[1–7] Conservative treatment modalities such as Pavlik harness and abduction orthesis have high success rates in infants.[6,7] But older children with DDH are more difficult to treat. Treatment modalities include open reduction with or without femoral and pelvic osteotomies.[8–11] In the neglected cases, open reduction combined with femoral shortening osteotomy alone is not enough and we prefer acetabuloplasty to stabilize the reduced hip. Various acetabuloplasty techniques can redirect, reshape or augment the acetabulum. Good results have been reported with all acetabuloplasty techniques.[8,9,12] But Pemberton and Dega procedures have the advantage of producing an immediate improvement in the shape of the acetabulum.[13–15]

In all series reporting good results and function, the authors report complications such as avascular necrosis and redislocation in a very small number of cases.[2–17] Some authors report hip stiffness after the operative procedure.[8,11,12] Stiffness as a complication is rare and is usually resolved without treatment. The purpose of this report was to describe a case with severe stiffness of the hip due to hypertonicity in periarticular muscles after it was treated for DDH.

2. Case report

Three-year-old patient referred to our institution with bilateral DDH (Fig. 1), and left hip treated with adductor tenotomy, anterior

* Corresponding author. Tel.: +90 5356875181.
E-mail addresses: doktorturgut@yahoo.com (T. Akgül), sbgoksan@istanbul.edu.tr (S.B. Göksan), Ilker.eren@gmail.com (İ. Eren).
[1] Tel.: +90 2124142000.

2210-2612
http://dx.doi.org/10.1016/j.ijscr.2014.01.012

Fig. 1. Three-year-old patient referred to our institution with bilateral DDH (according to Tönnis classification, left hip is grade 4 and right hip is grade 3).

open reduction, femoral shortening osteotomy initially. Reduction was preserved in pelvipedal cast for six weeks, and abduction orthesis for 6 weeks more after. Patient was followed with Trevor et al.'s evaluation criteria.[18] One year after the first intervention right hip treated with anterior open reduction, femoral shortening osteotomy and Dega acetabuloplasty. As after the first surgery, reduction was preserved with pelvipedal cast for 8 weeks and abduction orthesis for 6 weeks (Fig. 2).

Third month after surgery, limited right hip range of motion and limb length discrepancy identified. Clinical examination revealed that, patient had a very limited range of motion, compensating this deformity with pelvis obliquity. There were twenty degrees of flexion contracture in the right hip. In the control X-ray there was concentric reduction in both hips (Fig. 3A). Full time extremity traction had started, but failed to get any clinical improvement. Patient examined under general anesthesia. Due to increased flexor and abductor tension, a gluteus medius, sartorius and iliofemoral band release had performed and increased hip range of motion obtained postoperatively. Abductor and flexor stretching physiotherapy postoperatively was applied to preserve motion. Patient was followed in outpatient clinic and at 3rd week control, both abduction and flexion contracture of the patient relapsed despite adequate physiotherapy. Patient had examined under general anesthesia again, and full range of motion without increased tension had observed in physical examination. For the identified hypertonicity, ultrasound guided 100 IU botulinum toxin A injection had performed to abductor group and iliopsoas muscles. After injection, night traction and day stretching exercises carried on. Fifth

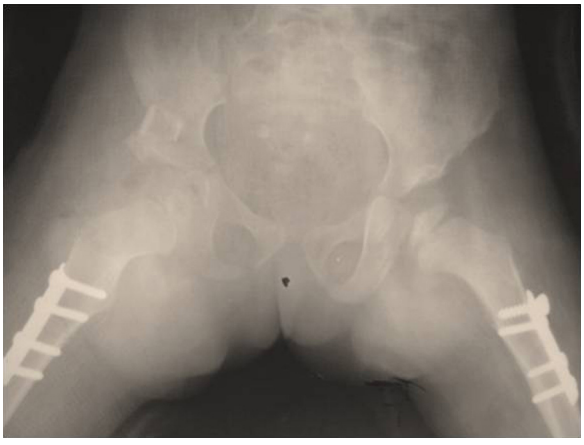

Fig. 2. Early postoperative X-ray after anterior open reduction, femoral shortening osteotomy and Dega acetabuloplasty of right hip.

Fig. 3. X-ray at postoperative 3rd month, limited right hip range of motion and limb length discrepancy identified.

Fig. 4. Fifth month after Botulinum injection, no flexor or abductor tension observed, and there was no pelvic obliquity.

month later, no flexor or abductor tension observed, and there was no pelvic obliquity (Fig. 4). Her neurologic examination was normal without any spastic muscle tightness except hip and neurologic developmental has been normal. Range of motions is noted as 90° of hip flexion, 25° of internal and external rotation, 10° of adduction and 30° of abduction. Patient was operated with Dega acetabuloplasty for acetabular dysplasia of the contralateral side. At final follow-up patient had no complaint with hip (Fig. 5).

3. Discussion

It is clear that conservative treatment of DDH leads to successful treatment for younger patients, however conservative treatment methods tend to fail for late diagnosed cases and surgery become unavoidable. With increased age, morbidity of

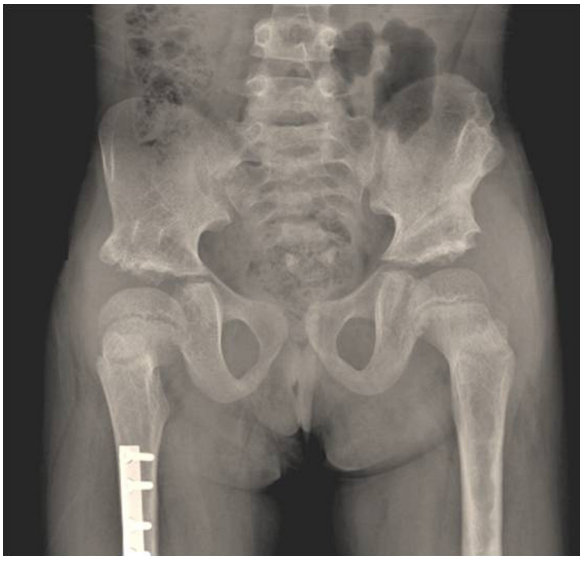

Fig. 5. Two years later after Botulinum injection. Left hip operated with Dega acetabuloplasty for acetabular dysplasia. Patient had no complaint with hips.

the surgery also increases. For younger cases, it is possible to obtain concentric reduction of femoral head in acetabulum with soft tissue procedures with medial or anterior approach. For older cases, acetabuloplasty or femoral shortening osteotomies are required.[8–12]

Successful outcomes with either soft tissue procedures and radical open reduction have reported.[8–15] There are articles about complications after both conservative treatment and surgical interventions. These reports include infection, recurrent dislocations and avascular necrosis.[2–17] Avascular necrosis is the most frightening complication.[19,20] Very few papers emphasize spontaneously relieving limitation of the hip range of motion, and those blame on long immobilization.[8,11,12]

We studied limitation of the range of motion after radical reduction of the hip. Limitation of the hip range of motion at third month follow up, despite the shortening osteotomy and absence of forcible reduction, initially diagnosed as chondrolysis and traction commenced. Due to clinically and radiographical pursuing abductor and flexor tension, and ongoing hip flexion contracture under anesthesia, surgical flexor and abductor release performed.

For a short period postoperatively, physical therapy provided improving hip range of motion. However, longer follow up revealed recurring hip flexor and abductor tension, which suggested that underlying pathology could be hypertonicity.

Hypertonicity especially in children, is defined as increased muscle tension against passive stretching.[21–23] It is mostly related with first motor neuron diseases. Although local hypertonicity for hip is not reported yet, it is studied particularly for torticollis in literature.[22,23] Superior results are reported after Botulinum Toxin A therapy for hypertonicity. There are also good results for Botulinum Toxin A injection for hypertonicity related torticollis.[22,23] Ultrasound guided Botulinum Toxin A injection performed for this case with the diagnosis of hypertonicity. Night traction and daily physical therapy carried on. Dramatic recovery of the hip flexion contracture and range of motion after injection, supports the local hypertonicity.

Surgery is the only treatment modality for late diagnosed DDH. Radical open reduction is a successful treatment, however complications are also encountered. One of the rare, and least studied complication is hip stiffness. Usually it is related with immobilization or surgery associated joint contracture, and spontaneous recovery is expected. Presented case is diagnosed as hip stiffness due to underlying local hypertonicity. This situation is different from spontaneous recovery of postoperative hip range of motion limitation and treatment can only be achieved by reduction of the muscle hypertonicity by neuromuscular junction blockage.

Conflict of interest

None declared.

Funding

None declared.

Ethical approval

We had informed consent.

Author contributions

Süleyman Bora Göksan did data analysis and study concept. Turgut Akgül did writing. İlker Eren did data collection.

References

1. Fredensborg N. The results of early treatment of typical congenital dislocation of the hip in Malmö. *J Bone Joint Surg* 1976;**58**:272–8.
2. Gabuzda GM, Renshaw TS. Current concepts review. Reduction of congenital dislocation of the hip. *J Bone and Joint Surg* 1992;**74**:624–31.
3. Von Rosen S. Diagnosis and treatment of congenital dislocation of the hip joint in the new-born. *J Bone Joint Surg* 1962;**44**:284–91.
4. Weinstein SL. Natural history of congenital hip dislocation (CDH) and hip dysplasia. *Clin Orthop* 1987;**225**:62–76.
5. Weinstein SL, Ponseti IV. Congenital dislocation of the hip. Open reduction through a medial approach. *J Bone Joint Surg* 1979;**61**:119–24.
6. Grill F, Bensahel H, Canadell J, Dungl P, Matasovic T, Vizkelety T. The Pavlik harnessin the treatment of congenital dislocating hip: report on a multicenter study of the European Paediatric Orthopaedic Society. *J Pediatr Orthop* 1988;**8**:1–8.
7. Nakamura J, Kamegaya M, Saisu T, Someya M, Kouzimi W, Moriya H. Treatment for developmental dysplasia of the hip using the pavlik harness. *J Bone Joint Surg* 2007;**89**:230–5.
8. Gavin S, Richard H, John HW, Andreas R. Effect of innominate and femoral varus derotation osteotomy on acetabular development. *J Bone Joint Surg* 2009;**91**:2622–36.
9. John HW, Simon RT, Robert B. Salter osteotomy for late-presenting developmental dislocation of the hip. Outcome at forty-five years after open reduction and innominate surgical technique. *J Bone Joint Surg* 2008;**90**:238–53.
10. Biçimoğlu A, Agus H, Omeroglu H, Tumer Y. Six years of experience with a new surgical algorithm in developmental dysplasia of the hip in children under 18 months of age. *J Pediatr Orthop* 2003;**23**:693–8.
11. Morcuende J, Meyer M, Dolan L, Weistein S, Longterm. Outcome after open reduction trough an anteromedial. Approach for congenital dislocation of hip. *J Bone Joint Surg Am* 1997;**79**:810–7.
12. Morsi E. Acetabuloplasty for neglected dislocation of the hip in older children. *J Bone Joint Surg* 2007;**89-B**:372–4.
13. Ruzskowski K, Pucher A. Simultaneous open reduction and Dega transiliac osteotomy for developmental dislocation of the hip in children under 24 months of age. *J Pediatr Orthop* 2005;**25**:695–701.
14. Grudziak JS, Ward WT. Dega osteotomy for the treatment of congenital dysplasia of the hip. *J Bone Joint Surg Am* 2001;**83**:845–54.
15. Karlen J, Skaggs D, Ramachandran M, Kay R. The Dega osteotomy: a versatile osteotomy in the treatment of developmental and neuromuscular hip pathology. *J Pediatr Orthop* 2009;**29**:676–82.
16. Senaran H, Bowen R, Harcke T. Avascular necrosis rate in early reduction after failed pavlik harmless treatment of developmental dysplasia of the hip. *J Pediatr Orthop* 2007;**27**:192–7.
17. Kim J, Shin S. Severe perthes disease or late avascular necrosis after successful closed reduction of developmental dysplasia of the hip. *J Pediatr Orthop* 2010;**19**:155–7.
18. Trevor D, Johns DL, Fixsen JA. Acetabuloplasty in the treatment of congenital dislocation of the hip. *J Bone Joint Surg* 1975;**57**:167–74.
19. Salter RB, Kostiuk J, Dallas S. Avascular necrosis of the femoral head as a complication of treatment for congenital dislocation of the hip in young children: a clinical and experimental investigation. *Can J Surg* 1969;**12**:44–61.

20. Kalamchi A, MacEwen GD. Avascular necrosis following treatment of congenital dislocation of the hip. *J Bone Joint Surg Am* 1980;**6**: 876–88.
21. Wissel J, Entner T. Botulinum toxin treatment of hip adductor spasticity in multiple sclerosis. *Wien Klin Wochenschr* 2001;**113**:20–4.
22. Lorentz IT, Subramaniam SS, Yiannikas C. Treatment of idiopathic spasmodic torticollis with botulinum-A toxin: a pilot study of 19 patients. *Med J Aust* 1990;**21**:152528–30.
23. Kaufman DM. Use of botulinum toxin injections for spasmodic torticollis of tardive dystonia. *Neuropsychiatry Clin Neurosci* 1994;**6**:50–3.