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Research Article

Dysplasia of the hip in children-earlier referrals: a key for better outcomes

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ABSTRACT

Background: Developmental dysplasia of the hip (DDH) is an abnormal alignment of the hip which may present at birth or develop later as the child grows. Closed reduction of the hip with application of a Spica cast is one of the preferred methods of treatment. The aim of our study is to assess the success rate of closed reduction, rate of avascular necrosis, reasons for failure of closed reduction and to suggest ways to improve our current practice.
Methods: We retrospectively studied the medical records of all patients who underwent closed reduction of the hip for DDH at Royal Derby Hospital, UK from October 2008 to June 2014. Seventy-two patients with 88 dysplastic hips met the inclusion criteria of the study.
Results: Sixty-two hips (70.5%) had a very satisfactory outcome. 26 hips (29.5%) were unstable after closed reduction, and open reduction was subsequently performed. Seven hips (7.9%) developed avascular necrosis (AVN). In the case of the 26 failed hips, we found that 92% had delayed referrals according to NIPE guidelines and 94% of these presented at the age of six months or more.
Conclusions: Early referral is one of the important factors which determine a successful outcome following closed reduction of hip in DDH.

Keywords: DDH, Hip, Spica cast

INTRODUCTION

Developmental dysplasia of the hip (DDH) is a congenital deformation or a malalignment of the hip joint, and can range from barely detectable to a dislocated hip. The incidence of DDH is one to three per thousand live births and its aetiology is multi-factorial.[1] The most common risk factors include; Breech presentation and Family history.[2]

The management of DDH is dependent on the age of presentation.[3] A Pavlik harness is the preferred treatment in the first instance following detection of DDH. A Closed reduction and hip-spica application is then recommended for cases which are resistant to treatment with a Pavlik harness. In our unit, if the child presents at 3 months with DDH then a Pavlik harness is not used as it is unlikely to benefit at this stage.[4-6]

Instead a closed reduction is undertaken at five to six months of age in these children with good results.[5] A closed reduction is usually undertaken in a child aged 1 year and under. In children older than one year of age, an open reduction is usually the preferred treatment of choice as a closed reduction is less likely to be successful.[7,8]

METHODS

We retrospectively studied the medical records of all patients who underwent closed reduction of the hip for DDH at Royal Derby Hospital from Oct 2008 to Jun 2014 (68 months).

We identified 78 patients who had a closed reduction over the period of this study (five yrs and eight months). The inclusion criteria were all babies with DDH with no other

associated problems. Babies who were initially managed by Pavlik harness but failed to improve were included as well as those that presented after 3 months of age (these were not treated with pavlik initially). Exclusion criteria were underlying neuromuscular disorders or syndromic children. Hence six patients were therefore excluded from the study. The mean patient follow-up was 30 months (Range 24-36).

All patients had preliminary treatment with Pavlik Harness if aged six weeks or less at presentation. If there has been no improvement with a Pavlik harness at four weeks, the harness is abandoned and no further treatment is undertaken. A closed reduction is undertaken at five to six months of age. Those presenting after three months were not put in a harness as it was considered late for treatment with a harness and instead a closed reduction is undertaken at five to six months. An examination under anaesthesia and an arthrogram is undertaken initially. If it confirms concentric reduction then a closed reduction is undertaken along with a percutaneous adductor tenotomy. A hip spica (one and a half) was applied. A postoperative CT scan is undertaken to confirm reduction of the hip. The hip spica was changed at 6 weeks again with an arthrogram to confirm satisfactory reduction. The total duration of hip spica is 12 weeks. No patients were placed into abduction splints after removal of the spica cast as it was felt that duration of immobilisation was adequate.[9,10] We do not use preliminary traction prior to closed reduction or open reduction in our unit.[11-15] The babies were followed-up at regular intervals after treatment. An ultrasound scan was used if the child was under 1 year of age or an x-ray after one year of age for assessment of reduction of hip.

According to NIPE (Newborn and Infant Physical Examination) guidance a clinically abnormal hip warrants specialist consultation and treatment within two weeks of diagnosis.[16] Babies with DDH but with no risk factors should be seen within four to six weeks for a full assessment, including ultrasound scanning and treatment. A referral for hip screening was considered delayed if the babies presented outside these time constraints.

RESULTS

In the study period of 68 months, 78 patients presented to the RDH with diagnosis of DDH, in whom 72 patients met the inclusion criteria (Table 1).

67 patients (88%) were females and represented 82 hips and five patients were males and represented 6 hips. 37 patients had left sided hip dysplasia, 19 patients had right sided involvement, and the remaining 16 were bilateral.

12 patients were referred from nearby hospitals, 37 by general practitioners, 22 by paediatricians and one was a referral from a physiotherapist. Only 29% of those referrals were within the NIPE guidance timescale. 71% were therefore delayed referrals.

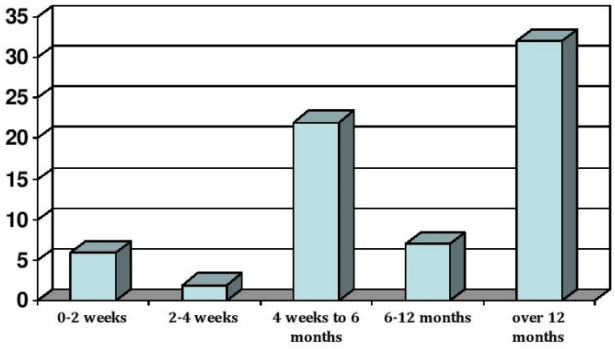


Figure 1: Time of presentation.

The modal age at time of presentation was 'older than 12 months' (32 patients-44%). six patients (8.3%) were less than two weeks old at time of their first presentation, two patients (2.7%) were age two to four weeks, and 22 patients (30.5%) were age four weeks to six months. There were seven patients (9.7%) age six to 12 months (Figure 1).

In 60/88 hips (68%), the femoral head remained stable and concentrically reduced at the time of closed reduction. Two hips had a redo closed reduction. In total, we undertook a successful closed reduction in 62 hips which represents 70.5%.

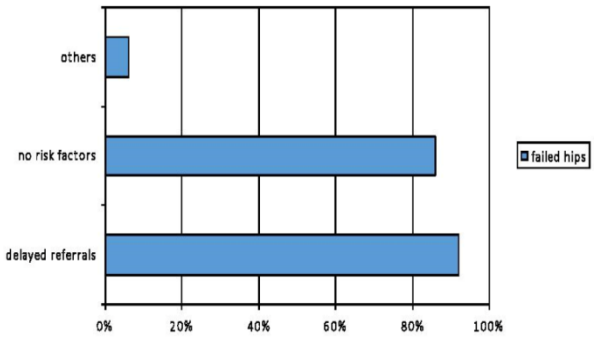


Figure 2: Reasons for failure.

26 hips (29.5%) were unstable after closed reduction, and open reduction subsequently was performed. 92% of these cases, in which closed reduction was not successful, presented after 8 weeks and in 94% of them there was no identifiable risk factor (Figure 2).

22 patients were seen between six weeks and six months. Seven patients presented between six months to twelve months. 32 patients presented after 12 months and closed reduction failed in ten of them.

Eight patients required operative treatment with Salter osteotomy. Seven hips (7.9%) developed avascular necrosis (AVN). Three patients (3.4%) developed plaster sores, and one patient developed wound infection and treated with antibiotics.

DISCUSSION

A Late referral of a patient with DDH could be an important factor in the failure of closed reduction.[17] The NIPE guidance suggests that all clinically abnormal hips should be referred for hip screening by two weeks and all the babies with risk factors should be referred by four to six weeks for assessment and treatment. Pavlik harness application is generally successful if treatment is started by two weeks for clinically abnormal hips or by six weeks for at risk hips following scanning.[16] In our unit if a child presents with DDH after 12 weeks, a Pavlik harness is not used as it is unlikely to correct the problem.[4-6] In these cases a closed reduction with hip spica application under a general anesthetic is undertaken routinely at five to six months. In our study after one year of age a closed reduction becomes less successful and hence an open reduction is undertaken routinely. Also, a closed reduction at 5-6 months in addition to being successful is also less likely to need further surgery for acetabular dysplasia. There is evidence to show that acetabular dysplasia is likely to improve spontaneously if treatment is undertaken before 2 years.[18-20] On the other hand a closed reduction for late presenters may not be successful or may not adequately address acetabular dysplasia.[21] This needs to be monitored regularly to see if further surgery is needed for acetabular dysplasia. In our study group some open reductions were combined with Salter osteotomy in children over 2 years of age. In the past without the NIPE guidance, the referrals for hip screening were delayed in our unit. Some of the referrals were from other hospitals which did not have well established NIPE protocols and some were from General practitioners, which added to the delay. NIPE guidance should help in increasing the capture rate of DDH and thus avoid the delay in instituting the treatment.

We also noted in our study that there was a significant subgroup of patients where there were no risk factors for DDH and the initial examination by the Pediatricians was normal but presented later after one year with DDH. A universal screening in this respect might avoid this problem but literature suggests that it is still possible to have late presentations of DDH despite universal screening.[19] We undertake a selective screening in our unit in line with the rest of the units in this country. Further audits in hip screening following introduction of NIPE guidance will be useful in ascertaining the effectiveness of selective screening in our unit.

Avascular necrosis is a major complication in DDH. The role of traction, Closed or Open reduction, extreme abduction in hip spica, duration of hip spica and presence or absence of ossific nucleus of the femoral head prior to open reduction in the causation of avascular necrosis is debatable. A meta-analysis by Novais et al, which comprised of 481 hips treated by closed reduction and 584 hips treated by open reduction, did not find any association between closed reduction undertaken before or after 12 months and avascular necrosis.[22] There was also no association between the type of surgical approach (anterior or medial approach) and avascular necrosis. In our study the incidence of avascular necrosis is 7.9% (7 out of 88 hips) and this is comparable to that reported in this meta-analysis (8%) (23) (Table 2).

There are some inherent weaknesses in this study. This series is a retrospective study looking at patients medical records and x-rays and hence has its limitations. This study group involved two surgeons and hence some differences in the treatment protocols were inevitable. The documentation with regards to severity of dislocation vis a vis whether it was subluxation, dislocation or stable dysplastic hip was not accurate. There was no clear documentation in some instances as to when the Pavlik harness was abandoned or at what stages a closed reduction was undertaken. There was no clear documentation as to what factors were taken into consideration to determine that the Pavlik harness was not working.

CONCLUSION

Early referral is the key to a successful outcome in DDH treatment. NIPE guidance will improve the referral pathway for hip screening and hence avoid unnecessary delays in referral. All the health workers involved in the care of these children should be educated about the NIPE guidance and the referral pathways. Parent education is equally important in recognizing the problem, use of Pavlik harness and the importance of regular follow-ups.

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