EVALUATION OF FIXATION FOLLOWING PROXIMAL TIBIAL VALGUS OSTEOTOMIES IN CHILDREN WITH BLOUNT’S DISEASE

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INTRODUCTION

Pathologic genu varum is progressive and rarely spontaneously resolves. Blount (1937) divided infantile (less than 5 years old) from the adolescent form (greater than 6 years old). A radiographic classification, developed by Langenskiöld (1981), demonstrated medial metaphyseal fragmentation, proximal beaking, varus, physeal depression, and osseous bridging.

Radiographic measurements differentiate infantile tibia vara from physiologic genu varum. Levine and Drennan (1982) measured the angle between the metaphysis and the diaphysis (metaphyseal-diaphyseal angle or MDA).

The purpose of proximal tibial osteotomy in Blount’s disease is to prevent development of osteoarthritis by correcting of the mechanical axis. Pinkowski (1995) noted the complications of osteotomy to include, compartment syndrome, peroneal nerve palsy, infection, growth plate damage, iatrogenic fractures, vascular injury, recurrence of angular deformity, fixation failure, and nonunion. Loss of alignment may lead to complications such as nonunion and recurrence of deformity. Types of fixation include cast immobilization, rigid internal fixation with a plate and screws, limited internal fixation with pins, and varying constructs of external fixation. A literature review failed to produce a study on early loss of alignment.

METHODS

A retrospective analysis was conducted on children with a diagnosis of Blount’s disease who underwent proximal tibial osteotomy during the period from January 1980 to December 1999. The medical record was reviewed for date of birth, date of surgery, sex, side of operation, and fixation type.

For each child the radiographic MDA described by Levine and Drennan (1982) was measured by a single investigator. The preoperative radiograph, the operative radiograph, and the early postoperative radiograph (taken on the first follow-up clinic date) were measured.

**Figure 1:** A radiograph of a child with bilateral Blount’s disease, note the MDA.
Loss in alignment was defined as a change in Mad from the operative to the radiograph at follow up.

The data was then compiled and a statistical analysis was conducted accounting for age (less than 6 years versus 6 years or more), sex, side of operation, preoperative deformity (less than 74° versus greater than or equal to 74°), and fixation method. Statically analysis was performed using chi square for normal data and an unpaired t-test for grouped continuous variables. A p-value <.05 was considered significant.

**RESULTS AND DISCUSSION**

The study consisted of 35 children with 49 osteotomies. There were 21 males and 14 females. The mean children’s age at surgery was 9 years 10 months (range 2 years 5 months to 17 years 2 months). Of the thirty five children, 10 were less than 6 years old (infantile), and 25 were 6 years or older (adolescents). There were 26 right limbs and 23 left limbs. The mean preoperative MDA was 70° (range 50° to 85°). Preoperative MDA was more than 74° in 16 limbs while 33 limbs had a preoperative MDA equal to or less than 74°. Fixation was with pins in 20 limbs, plate and screws in 15 limbs, external fixation in 10 limbs, and cast in 4 limbs. The mean angle change from the operative radiograph to the early follow-up radiograph was 3° (range from 7° valgus to 14° varus).

There was no statistically significant difference in the mean MDA change versus age (infantile versus adolescent), sex, operation side, preoperative MDA. Plate fixation (mean MDA change of 1°) was found to be statistically better than pin fixation (mean MDA change of 4°) p-value .047.

This study evaluated early loss alignment following proximal tibial osteotomy in children with Blount’s disease. Plate fixation was found to be statistically better than pin fixation.

**SUMMARY**

The goal of high tibial osteotomy, a surgical treatment for Blount’s disease, is correction of the mechanical axis of the limb. 35 children with Blount’s disease underwent 46 proximal tibial valgus osteotomies during the period from January 1980 to December 1999. A retrospective analysis for change in angular correction in the early postoperative period was conducted. The tibial metaphyseal-diaphyseal angles were measured preoperatively, at surgery, and at initial healing. Our data did not yield and statically significant change with respect to age, sex, side of operation, or preoperative deformity. Plate fixation was found to be statically superior to pin fixation.

**REFERENCES**