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Arthrodesis and Hemiarthroplasty: Treatment of Hallux Rigidus

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Abstract

Hallux Riddus is a progressive degenerative disease affecting the first metatarsal joint. The purpose of this study was to report our experience with treating patients with RH with two different surgical approaches: arthrodesis and hemiarthroplasty. Twelve patients underwent HR surgery from July 2004 to October 2009. The median age was 58 years. At the time of surgery, the patients had different types of FC, according to the modified Regnauld classification. Outcomes were assessed using the American Orthopedic Foot and Ankle Association's Hallux Metatarsophalangeal-Interphalangeal Scale. Tests were performed after one month and then followed by a mean follow-up of 48 months; IQR 29.3–58.0. In the joint treatment group, we observed a mean improvement of 35.5 points at early follow-up. In the artificial joint replacement group, the mean difference at follow-up was 33 IQR 30.5–33.0; p=0.022. At midterm follow-up, the joint surgery group showed a mean difference of 35 IQR (33.0–35.25) compared with the arthroplasty group with a mean score of 30.5 IQR (28.0– 32.5). Our outcomes are consistent with the current understanding of two surgical techniques for the treatment of RH: Today, arthrodesis is considered the treatment of choice in grades III and IV. Hemiarthroplasty seems to be a promising option. Joint pain management and flexibility are fundamental to preventing recurrence and restoring range of motion in dorsal flexion. This article is a retrospective case series with level 4 evidence.

Keywords: Arthroplasty; Surgery; Hallux Rigidus

Introduction

Hallux Riddus is a progressive degenerative disease affecting the first metatarsal joint, first reported by Davies-Colley in 1887. RH, after hallux valgus, is the most common condition in the first MTP joint, with a prevalence rate of 2% in humans between 30 and 60 in the United States. The cause is unknown but appears to be complex, with arthritis, improper shoe use, and trauma being the most common predisposing factors. Other predisposing factors are the long first tarsal bone, the flat tarsal head, the pesplanus, the dorsal flexion of the first tarsal bone, and the long, narrow foot. Diagnosis was based on clinical examination and radiographs showing narrow articular line, dorsal osteophytes, and metaphyseal flattening with sesamoid involvement. RH manifests clinically with primary MTP stiffness and the sesamoid complex causing arthralgia and limited range of motion in gait and joint function. There are many options for treating RH depending on the patient's age, disease stage, activity level, and severity of lesions. For personnel classification, the Regnauld classification with modifications proposed by Collins and Shurnas is widely used. According to the outcomes of the literature, osteotomy with 25-33% resection of the metatarsal spines and proximal phalanges is recommended for early stages and for grades I and II of RH; Removal of more than one-third of the joint surface can lead to instability and subdislocation. In grades III and IV, the best outcomes achieved with joint replacement surgery include joint replacement surgery and joint therapy [1-5]. Although implants, hemiarthroplasty, and arthroplasty have shown good outcomes with good joint mobility, complications related to postoperative first-radiation instability, shortening, and ankle pain have been reported, limit the use of this treatment.

Materials and Methods

The patients were considered to have rigid hallucinogens according to the "International Classification of Diseases, Revision 10" procedural code. All patients with lateral curvature > 15°, gout or sesamoid arthritis-MTP, and arthritis were excluded. The study was approved by the local ethics committee and complied with the Declaration of Helsinki.

The patient source was the outpatient department of the University of Catania Orthopedic Clinic. Data was extracted by the two of us, and the outcomeing measurements and statistical analysis were performed by one of us. For the personnel classification, we used Regnauld's classification with modifications proposed by Collins and Shurnas [6, 7].

We use the following surgical options: Joint surgery, hemiarthroplasty. Joint surgery was performed with a super-central longitudinal incision centered on the first MTP with a longitudinal incision of the capsule with surgical fusion of the joint using pins or screws. On the anterior plane, the joint is blocked in the neutral position; in the horizontal plane, the joint is blocked from 15° to 20° in valgus; and in the sagittal plane, the joint is blocked during dorsal flexion between 20° and 30°. Hemiarthroplasty has been performed using ankle implants with the aim of maintaining range of motion and avoiding osteoarthritis. We used the Hemicap implant with metaphyseal resurfacing as described by Hasselmann and Shields. At follow-up, patients were assessed by clinical investigation and radiographic examination at 1, 3, and 6 months [8, 9]. The final assessment was performed at an inter-regional average of 48 months. Outcomes were assessed using the American Orthopedic Foot and Ankle Association's Hallux Metatarsophalangeal-Interphalangeal Scale. This score was not modified despite the fact that the first MTP joint surgery outcomeed in a maximum score of only 90, as 10 points were awarded for the movement of the MTP joint. A numerical rating scale is used to indicate pain severity. However, different surgeries were performed by two different surgeons who were

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not involved in the scoring. No comparison group was considered and no explanatory analysis was performed. AOFAS scores were recorded before surgery, one month after surgery, and then with a mean follow-up of 36 months by two different investigators.

In hemispheric surgery, weight bearing is allowed one day after the intervention with Baruk shoes. Hard shoes are authorized 15 days after operation. After hemiarthroplasty, we offer this protocol: The restoration process begins with the removal of stitches, emphasizing flexibility at each stage of restoration. State 1: rest, nonsteroidal anti-inflammatory drugs, and ice.Phase 2: ice, actively and passively mobilize the first MTP joint, stretch the plantar fascia and the abdominal muscles. We allow gradual weight bearing with hard shoes. Gradually, the patient begins with self-perception exercises of the Biomechanical Foundation System. Step 3: While rehabilitation continues, the patient gradually returns to activities of daily living, checking for recurrent pain or stiffness [10]. After joint surgery, patients walk in Baruk shoes for 30 days, after which weight bearing is gradually allowed with rigid shoes, and even in patients with esophageal dilation and muscle exercises.

Discussion

Arthrodesis is indicated in severe HR grade III with poor mobility and grade IV in all patients who, because of their activity, require joint stabilization: there is a cosmetic contraindication in women who do not want to give up high heels. Various techniques have been described for arthroplasty, with single screw, double screw, pin or clavicle. All authors emphasize on stability of synthesis to avoid pseudo-pain and pain. Arthroscopy is the treatment of choice when less than 50% of the tarsal joint surface is in good condition and is a lifesaver after other techniques. Complications of this treatment include dislocation, pseudoarthrosis, and osteoarthritis of the interphalangeal joint. Beeson in his review found the success rate of arthroplasty to be 90%, with residual pain present in 22 to 30% of cases. Raikin, in a retrospective series comparing the treatment of patients with first-time severe MTP arthritis, treated the patient with arthroplasty and hemiarthroplasty with the Bio Pro implant. : Better outcomes were obtained in the arthroplasty group, with an improvement of 87% versus 60%, respectively. In the arthroplasty group, there was no need for revision surgery and consolidation was achieved 12 weeks after surgery. However, the patients in this group suffered from minor complications including irritation caused by the screw head, calluses in the leg, and instability of the second MTP joint.

Conclusion

RH is an underappreciated pathology that can affect both young and old patients. Heart rate is often underestimated in the early stages when clinical signs are weak. In the severe stage, it is a disabling disease, greatly affecting the ability to walk. At this point, any conservative methods are ineffective and surgery is the only option. Several techniques are described for the treatment of RH. In our study, we considered only two options. Today, according to most authors, arthroplasty is considered the treatment of choice in grades III and IV HR and our outcomes confirm this assertion. Good short-term outcomes are yet to be confirmed, with case series more consistent with long-term follow-up. Concerns remain about arthroplasty and further research is needed, especially to compare different implants often characterized by different total, ankle, or phalangeal replacement philosophies.There is very little literature on rehabilitation after personnel surgery. In our opinion, the main goals to be achieved are: control pain and improve joint mobility to restore good mobility. The key, to prevent recurrence, is to restore the ROM of the first MTP joint in the dorsal flexion.

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