Keller Arthroplasty: The Appropriate Procedure for the Proper Patient
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Introduction

In 1904, William Keller was the first to describe resection of the base of the proximal phalanx (5). The Keller arthroplasty has traditionally been indicated for painful hallux valgus and hallux rigidus with associated degenerative joint disease in the older population (1-2, 5, 6, 8). This population has been the focus due to many factors. It has been noted that patients of increased age have a decrease in both cancellous and cortical bone density, which can make fixation challenging in other operative fusions such as arthrodesis or most metatarsal head procedures (7). Studies have shown that age leads to delayed sphatulation (4). Hocking et al. documented that first and second surgery rehabilitation is increased 1.5 to 2 times that of a young patient not requiring precautions in using short leg non weight-bearing casts, concomitant limb injury and the increased risk of falling (3).

There are several benefits to the Keller arthroplasty including pain relief, correction of deformity, and a quicker return to activity post-operatively. However, every procedure has its potential complications. Complications include transfer lesions, metatarsalgia, loss of toe purchase, phalangeal cosmetic appearance and weakness during the push off phase of gait (1–2, 5, 6, 8). Despite these complications, this procedure has been demonstrated as a reasonable alternative to amputation if ulceration is present or surgeries with long term recurrences such as arthrodesis.

Materials and Methods

This prospective study aims to demonstrate that the Keller arthroplasty is indeed a good and appropriate surgery for the proper patient with hallux valgus, hallux limitus, and chronic plantar hallux ulcerations. We expect that first metatarsophalangeal (MTP) joint dorsiflexion will increase both loaded and unloaded which will result in decreased pain and limitation, improvement in quality of life, and if an ulceration is present it will heal. We will also monitor and record any post operative complications and view what effect comorbidities have on them.

Demographics

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<th># of Patients</th>
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**Gender**
- Males 23/25 (92%)
- Females 2/25 (8%)

**Age (mean)**
- 67.0 years

**Diabetes**
- 17/25 (68%)

**PVD**
- 0/25 (0%)

**Neuropathy**
- 8/25 (32%)

**Smoking**
- Non: 5/25 (20%)
- Current: 6/25 (24%)
- Past: 13/25 (52%)

**Ulcer present**
- 4/25 (16%)

**Pain Average (1-10 scale)**
- 3.02

**Quality of Life (1-10 scale)**
- 6.54

Results

Keller arthroplasty proves to be a stable option for those with hallux limitus/rigidus, hallux valgus, or with a resistant plantar hallux ulceration. Patients noted an improvement in pain and quality of life while physical exam revealed increased 1st MP joint dorsiflexion and healed ulcerations. As most of our patients were men older than 55, cosmesis was not a major factor for them. Limitations of the current study include: small sample size, focused specific population studied (mostly males older than 55 years of age) and not all data sought for were within the electronic medical records. We are currently expanding this prospective study.

Conclusions

The Keller arthroplasty proves to be a viable option for those with hallux limitus/rigidus, hallux valgus, or with a resistant plantar hallux ulceration. Patients noted an improvement in pain and quality of life while physical exam revealed increased 1st MP joint dorsiflexion and healed ulcerations. As most of our patients were men older than 55, cosmesis was not a major factor for them. Limitations of the current study include: small sample size, focused specific population studied (mostly males older than 55 years of age) and not all data sought for were within the electronic medical records. We are currently expanding this prospective study.

Bibliography