CASE REPORT

Silastic arthroplasty of the first metatarsophalangeal joint as salvage for failed revisional fusion with interpositional structural bone graft

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SUMMARY

Silastic arthroplasty of the first metatarsophalangeal joint should be considered a viable salvage procedure either for cases of previously failed fusion with interpositional tricortical bone grafting, or for cases of painful previous Kellers, as it can restore length back to the toe, power, stability of gait and therefore reduce pain.

BACKGROUND

The patient had three previous failed surgical attempts at fusion of first metatarsophalangeal joint, including two attempts at interpositional bone grafting, and had been left with a painful short Keller's pseudoarthrosis. While interpositional bone grafting is described as a salvage technique for failed arthroplasty or Kellers, we were unable to find prior published reports of silastic arthroplasty as a salvage technique for failed interpositional grafting.

CASE PRESENTATION

A 64-year-old gentleman was referred to our clinic for ongoing further management of his left big toe. He had longstanding poliomyelitis in his right leg, for which he required a double iron calliper to mobilise. He was a non-smoker.

He presented with marked shortening and a vertical cock-up deformity of his left big toe. Passive movements of the joint were very painful. He had undergone initial attempted first metatarsophalangeal (MTP) joint arthrodesis 6 years previously for primary hallux rigidus, which went onto painful non-union. He subsequently underwent two revisional attempts at fusion, with interpositional tricortical bone grafting and plating, each going onto further painful non-union. He was finally treated with excision arthroplasty and left with a pseudoarthrosis. Prior to his initial surgery, his left foot was his good stable platform allowing propulsive mobility, given his poliomyelitis affecting his opposite right leg resulting in weakness and reliance with this leg on a calliper. However, his pseudoarthrosis had left him with a very short floppy toe, with no propulsive power, which meant that transfer and mobility had become very difficult, meaning he was no longer independently mobile and had become reliant upon a wheelchair.

Clinical examination revealed a painful, short left toe with a vertical cock-up deformity, multiple scarring around the big toe, though no clinical signs of infection. Plain radiographs of the left foot

(figures 1 and 2) showed excision arthroplasty of the first metatarsophalangeal joint along with scattered fractured metalwork, in both first metatarsal and proximal phalanx. Radiologically, there were no lytic areas in the adjacent bones to suggest any ongoing osteomyelitis. Nevertheless, leucoscan was arranged to exclude any low-grade infection. Baseline screening blood tests were also performed, which were found to be within normal limits (C reactive protein 1, erythrocyte sedimentation rate 6). Leucoscan did not show any evidence of deep bony infection.

The pros and cons of silastic arthroplasty were discussed with the patient, and after due contemplation, he wished to proceed. He underwent silastic first metatarsophalangeal joint arthroplasty, with the removal of the broken metalwork and autogenous bone grafting to the medullary cavity cysts, without any perioperative complication. On 6 months review, he was delighted with the surgical results. The wound had healed well. Length of the big toe had improved, which was back down in a neutral position from its hyper-extended 'cocked up' position. This gave him a stable platform from which to propulse and mobilise. He had pain-free active and passive movements at the first MTP

Figure 1 Plain anteroposterior radiograph of left foot showing big toe deformity at presentation.

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Figure 2 Left lateral plain radiograph of left foot showing big toe deformity.

joint. Postoperative radiographs at 18 months (figures 3 and 4) were satisfactory and showed no interval changes.

INVESTIGATIONS

- ▶ Plain radiographs
- ▶ Bone scan

DIFFERENTIAL DIAGNOSIS

- ▶ Septic arthritis
- ▶ Chronic osteomyelitis

TREATMENT

Silastic arthroplasty of first metatarsophalangeal joint.

OUTCOME AND FOLLOW-UP

The patient was very delighted with the surgical results at 18 months.

Figure 3 Postoperative plain radiographs (anteroposterior view) of left foot.

Figure 4 Postoperative plain radiograph (lateral view) of left foot.

DISCUSSION

A variety of surgical procedures are available for treatment of primary hallux rigidus. Cheilectomy is suitable for early disease with success rate up to 92% in terms of pain relief and function.¹ For patients who have severe hallux rigidus, arthrodesis has a long history of reported clinical success and is still considered the gold standard,² though arthroplasty may be considered.³ The Keller resection arthroplasty originally described in 1904 with its later modifications is reserved for very low demand patients. For patients with symptomatic non-union from a failed first metatarsophalangeal joint fusion with bone loss, or for cases where previous Keller's resection arthroplasty had been performed, arthrodesis with interpositional structural bone grafting is now a well reported and recognised salvage technique.⁴⁻⁷ However, this technique is not without its risks and complications. Myerson *et al*⁵ reported a 21% non-union rate, at either the proximal or distal end of the interpositional graft. Brodsky *et al*⁶ reported a 33% rate of pain under the fusion mass at the level of the sesamoids, a 25% rate of symptomatic hardware requiring further surgery with removal and a 17% rate of major wound problems requiring plastic surgical flap coverage to the toe.

There is little in the literature to advise as to when this salvage operation of interpositional bone graft fails. Some people advocate excision and conversion to a fibrous pseudoarthrosis. However, this results in the complication of a very short, non-functional, floppy toe, with often a complete loss of toe-off gait, as in this case.

We report a different salvage option for consideration in such cases, with excision of the fibrous pseudoarthrosis and silastic arthroplasty. To the best of our knowledge, this has not been previously reported. This technique has the clinical advantage of restoring some or all the length back to the toe, restoring strength, power, dynamic control and stability back to the toe,

Learning points

- ▶ Silastic arthroplasty of first metatarsophalangeal joint is a viable salvage option.
- ▶ It improves pain and gait.
- ▶ It offers clinical benefit of restoring length, strength and stability.
- ▶ It achieves better outcome, overall.

improving toe push off and therefore gait, and reduction in overall pain. The authors feel this technique produces a better clinical outcome, and should be considered, either in preference to excision pseudoarthrosis when interpositional bone fusion fails, or as a potential salvage, for those patients with symptomatic fibrous pseudoarthrosis.

Competing interests None.

Patient consent Obtained.

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