Minimally Invasive Closing Wedge Osteotomy for Charcot Correction

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Introduction

Charcot arthropathy of the mid-foot can be associated with a progressive ‘rocker-bottom’ deformity, which may result in ulceration, which in turn can lead to amputation.

Corrective surgery of Charcot arthropathy has traditionally been performed by open surgery.

Minimally Invasive Surgery has been described for forefoot pathology.

Aim

To describe a new technique for corrective osteotomy for mid-foot Charcot arthropathy utilising a Minimally Invasive closing wedge osteotomy.
Technique

1. Under fluoroscopic guidance (Mini-C arm), the plane of the medial plantar based wedge is first marked on the skin.

1. K-wires are inserted from the medial aspect of the foot, to determine the boundaries of the wedge osteotomy.
3. A 1cm percutaneous stab incision is made on the dorso-medial aspect of the mid-foot

4. Using 2 & 3 x 20mm Minimally Invasive Shannon Burrs, the wedge osteotomy is created

5. The wedge is then converted to bone paste using a 3.1 and 4.1 mm Wedge burr

6. The resultant cavity is closed to correct the deformity and held with percutaneous fully threatened screws

7. ‘Allomatrix’ Bone Substitute is also instilled into the cavity
Case 1

Type 1 Insulin dependent diabetic male
Required Z-plasty to EHL tendon at 3 months to release chronic contracture
Case 2

Young adult male
Arthropathy developed prior to pancreatic transplant.
No longer IDDM, but still residual neuropathy
Case 3

Middle aged male
Non-diabetic neuropathic
Case 4

Evolving Mid-Foot Charcot

Insulin dependent diabetic

Middle aged female

Minimally Invasive Percutaneous stabilization performed 6 weeks after total contact casting commenced and patient then kept in cast for further 12 weeks
Case 5

Middle aged male

Charcot neuropathy secondary to nerve injury following spinal surgery

Initial surgery failed as implants to short
Required revision and awaiting forefoot surgery to correct toe position
Case 6

Middle aged male.

Previous 4th toe amputation for osteomyelitis.

Evolving Mid-Foot Charcot

Insulin dependent diabetic
Discussion

Charcot arthropathy remains a debilitating condition, with a significant burden on health services.

The socioeconomic burden is significant both in time and cost.

Patients can remain in total contact casting for 12 months or more, requiring weekly appointments with the diabetic clinic.

The risk of infection and subsequent amputation also remains high and the mortality for patients with diabetes, following amputation, increases, especially when performed as an emergency.

One patient had failure of metalwork, due to the screws being too short.

Conclusion

We present a case series of a new technique, which potentially reduces the complications associated with foot and ankle surgery for diabetic / neuropathic patients, which may also have far reaching socio-economic benefits, to both the patient and the wider health service.

Further audit and research is required, to determine the best hard wear construct to provide maximum stability. This technique also raises questions regarding the optimum timing of surgery.
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