The Avascular Proximal Pole Nonunion: is there a role for core decompression and biophysical treatment in bone union?

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RESULTS

<table>
<thead>
<tr>
<th>Patient Details</th>
<th>Treatment</th>
<th>Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male, 24 years old</td>
<td>6 months</td>
<td>3 months FU</td>
</tr>
<tr>
<td>Male, 30 years old</td>
<td>6 months</td>
<td>3 months FU</td>
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<tr>
<td>Male, 20 years old</td>
<td>2 years</td>
<td>2 months FU</td>
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</tbody>
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Vascular? Avascular? Does it make any difference?

Male, 18 years old

After the debridement the gap is nearly empty: it’s still amenable to screw fixation!

REFERENCES

INTRODUCTION

There is still no consensus on definition of vascular necrosis of the proximal pole.

Core decompression is a surgical technique to decompress bone marrow to reduce pressure and decrease bone resorption. In the literature, we find acceptable union rates in fixing the proximal pole with a non-vascularized bone graft (NVBG) from 60% even in the presence of poor or absent vascular supply.

Moreover, vascularized bone grafts (VBG) have been used for many years, with some promising results, especially in cases of pseudoarthrosis or non-union. Vascularized bone grafts have been shown to promote osteogenesis and angiogenesis, leading to improved bone healing and union rates. However, the surgical procedure is more complex and time-consuming compared to NVBG.

The most utilized techniques proposed for avascular proximal pole scaphoid reconstruction are dorsal pedicled VBG, volar pedicled VBG and free vascular pedicled VBG. Since some years, arthroscopy has been proposed for proximal pole non-union, even with vascular impairment, without bone graft or using a spongious NVBG to fill the empty space, with very good results, proving once again that is stability fixation, by means of screw or Kirschner wires, which creates the conditions for the neovascularization of the proximal pole.

OBJECTIVE

Evaluate an alternative treatment to Vascularized Bone Grafts (VBGs) in Avascular Proximal Pole Nonunions (APPN) using a stable fixation and radius bone graft harvested with Ilizarov’s core decompression concept, in association to Biophysical Stimulation for promoting bone regenerative factors.

METHODS

13 patients, between 18 and 30 years, with APPN confirmed by surgery and not respond to core decompression with bone pinning detected by CT in the last 3 years. The core decompression technique was performed using a small incision and a Kirschner wire was inserted in the proximal pole to create a dead space. The bone graft was harvested from the distal radius, free vascular pedicled NVBG, and spongious NVBG (with or without a pedicle) were used. The NVBG was harvested without vascular pedicle. The NVBG was fixed with plate and Kirschner wires to the radius distal to the fracture. The NVBG was fixed with plate and Kirschner wires to the radius distal to the fracture. The NVBG was fixed with plate and Kirschner wires to the radius distal to the fracture.

RESULTS

Radiological union was obtained in all patients with obvious proximal pole neovascularization, detected by CT or MRI, with good results in many patients, with respect of the morphology of the scaphoid. Optimal ROM recovery was observed, but with any functional limitation.

CONCLUSIONS

The technical aspects of this approach are similar to the increasing popular Arthroscopic Non-vascularized Bone Graft in APPN. Performing a stable fixation is easier with mini-open surgery, even with the “overgrows” Kirschner wires, but they must be inserted correctly in order to obtain just as stable fixation as that obtained with the headless screw. In practice, as long as the proximal pole is intact and the sagittal is good, it is possible to have its neovascularization. Considering the literature concerning this controversial topic, VBG still remains a correct indication in APPN and in secondary reconstruction after failed fixation with NVBG, but it is not an absolute indication.