A novel combined approach to the 1,2 inter-compartmental supraretinacular artery radial flap may correct scaphoid collapse and prevent non-union.

Dr N. Balague 1, Dr K.A. Vakalopoulos PhD 1, Dr P. Vostrel 1, Dr S. Boudabbous 2, Dr J.-Y. Beaulieu 1

1 Department of Hand and peripheral nerve surgery, Geneva University Hospitals, Geneva, Switzerland
2 Department of Radiology, Geneva University Hospitals, Geneva, Switzerland

BACKGROUND

Scaphoid non-union remains a major problem in hand surgery. The 1,2 intercompartmental supraretinacular artery flap, as first described by Zaidemberg, is widely used in this context and associated with a union-rate of about 80%. This flap is however limited in case of associated carpal collapse as in dorsal intercalated segmental instability (DISI) and humpback deformity.

Aim:
In this study, we present a novel approach to the 1,2 intercompartimental supraretinacular artery flap enabling the correction of associated carpal collapse.

MATERIALS AND METHODS

- 9 patients with scaphoid non-or-delayed-union with carpal collapse were treated with a new technique between 2006-2015
- Single centre, retrospective analysis of a prospective series

Technique:
- 1) Volar approach: Debridement decorticalisation of non-union site, correction of humpback deformity with the Lindscheid maneuver
- Measurement of the needed bone graft and rectangular corticotomy to receive inlay graft

- 2) Dorsal approach: 1,2 ICSRA localization, arthroscopy, radial styloidectomy
- Bone harvesting in radial metaphysis based on measured defect
- Transposition of bone flap anteriorly into non-union site
- Correction of humpback deformity and fixation with two retrograde 1.25 mm K-wires

- 3) Post-operative:
  - Immobilization by a short arm cast was applied for 8 weeks.
  - CT scan at 8 weeks and physical therapy

RESULTS

- Median follow-up time was 9 months (range 3-33 months)
- Median time from injury to non-union treatment was 6 months (range 3-24 months).
- Scaphoid non-union sites were in Schernberg zone 3 or 4 in 6/7 cases
- Median time for obtaining complete bone consolidation was 4 months (range 2-5 months)
- Union rate: 100% (by CT scan)
- Humpback deformity and DISI corrected in all cases
- The median size of the VBG was 9.2 x 10.1 millimeters varying between 6.4 to 10.2 millimeters of transversal length and 9 to 11.7 millimeters of longitudinal length
- No major complications

Table 2 Results

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<th>Long term SI angle</th>
<th>SI angle Corrected</th>
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Mean: 10.1/10.1

DISCUSSION / CONCLUSION

The 1,2 intercompartimental supraretinacular artery bone flap is a reliable treatment of scaphoid non-union associated with carpal collapse. Our combined volar and dorsal approach permits the correction of DISI and Humpback deformity without precluding scaphoid vascular supply, eliminating the need for the use of free bone flaps from other sites. In this series, we observed a 100% union rate without major complications.

This technique does not require the need for a second operative site or microsurgery and can be performed under locoregional anesthesia. In this study all patients acquired complete scaphoid union and all humpback deformities were corrected with no major complications. This novel technique should be further examined in a larger prospective series with a long-term follow-up.