

Proximal Row Carpectomy with Resurfacing Capitate Pyrocarbon Implant with Bone Graft for Scaphoid Nonunion Advanced Collapse III Wrist with Total Intramedullary Bone Resorption of the Capitate: A Case Report

Claire Bastard¹, Jean Noël Goubier^{1,2}, Frédéric Teboul^{1,2}

Learning Point for the Article:

Advance osteoarthritis of the midcarpal joint treatment often is arthrodesis of the wrist. A good alternative to maintain mobility is proximal row carpectomy with resurfacing capitate pyrocarbon implant.

Abstract

Introduction: One treatment of advanced carpal collapse with osteoarthritis of the midcarpal joint can be proximal row carpectomy (PRC) with pyrocarbon prosthesis implant, replacing the head of the capitate. We report a case of scaphoid nonunion advanced collapse (SNAC) III wrist with intramedullary bone resorption of the capitate.

Case Report: A 55-year-old man had major functional impotence of the wrist and right hand with an extremely evolved SNAC III wrist with completely intramedullary bone resorption of the capitate. On the basis of this diagnosis and due to refractory severe pain that did not respond to conservative treatment, we discussed 3 therapeutic options: PRC with resurfacing capitate pyrocarbon implant (RCPI) in case of a possible large bone graft intraoperatively, a pyrocarbon intermediate prosthesis like adaptative proximal scaphoid implant which is interposed between the radius and the second carpal row, or a complete arthrodesis of the wrist. He was successfully managed by capitate pyrocarbon prosthesis associated with capitate bone graft. The patient presented no pain and was satisfied with the operation. The X-ray showed a stable prosthesis.

Conclusion: Treatment of advanced carpal collapse with osteoarthritis of the midcarpal joint can be PRC with RCPI. However, when bone resorption of the capitate exists, surgical treatment usually is a wrist arthrodesis which is a good pain relief but blocks all movements. PRC with RCPI with bone graft can be a good alternative solution with pain relief and preservation of wrist mobility.

Keywords: Scaphoid nonunion advanced collapse, proximal row carpectomy, resurfacing capitate pyrocarbon implant.

Introduction

Proximal row carpectomy (PRC) is an accepted treatment for degenerative diseases of the wrist such as scaphoid nonunion advanced collapse (SNAC) [1]. When arthritis affects the midcarpal joint, PRC alone is contraindicated [2]. The replacement of the head of the capitate with the resurfacing capitate pyrocarbon implant (RCPI) (Tornier, Montbonnot Saint Martin, France) combined with PRC was first described by Goubier et al. [3]. Since 2011, few other studies showed that

it is a treatment option for degenerative wrist diseases when the articular surfaces of the capitate and radius are damaged, while at the same time preserving wrist motion [4, 5, 6]. We report our experience in proximal PRC and RCPI with capitate bone graft for SNAC III wrist with completely intramedullary bone resorption of the capitate of a 55-year-old patient. We review the clinical evaluation, X-ray, computed tomography arthrography (CTA), and the surgical treatment.

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Dr. Claire Bastard



Dr. Jean Noël Goubier



Dr. Frédéric Teboul

¹Private Hospital Paul d'Egine, 35 street Musselburgh, 94500 Champigny Sur Marne, France.

²International clinic of Parc Monceau, 21 street Chazelles, 75017 Paris, France.

Address of Correspondence:

Dr. Frederic Teboul,
Hôpital Privé Paul d'Egine, 35 Rue de Musselburgh, 94500 Champigny-Sur-Marne, France.
E-mail: f_teboul@hotmail.com



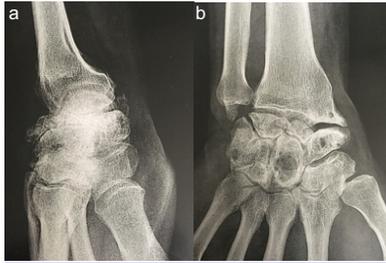


Figure 1: (a and b) X-ray: scaphoid nonunion advanced collapse III.

Case Report

A 55-year-old left-handed man complained of right wrist pain over 5 years. There was no history of systemic illness, steroid abuse, inflammatory disease, or specific trauma. He already had surgery for his SNAC III left wrist: RCPI resurfacing. He also had a history of bilateral carpal tunnel surgery and

used to work as a drywall guy. Physical examination: Right wrist: Extension 5°, flexion 10°; left wrist: 20° extension, flexion 20°; no pronation restriction was found in either side. CTA and X-ray showed evolve SNAC III and a completely intramedullary bone resorption of the capitate, as an empty recipient, and a major dorsal synovitis (Fig. 1 and 2). On the basis of this diagnosis and due to refractory severe pain that did not respond to conservative treatment, we discussed three therapeutic options: PRC with RCPI in case of a possible large bone graft intraoperatively, a pyrocarbon intermediate prosthesis like adaptative proximal scaphoid implant which is interposed between the radius and the second carpal row [7], or a complete arthrodesis of the wrist. We decided to perform an RCPI and bone graft. During surgery, we performed the PRC without any particular difficulty. The cortical bone of the capitate was good quality, and after ablation of endomedullary fibrosis we proceeded to the capitate bone graft with bone chips of 2–3 mm from the lunate and scaphoid, then we were able to implant the RCPI. The prosthesis was stable in all wrist movements. We had an uncomplicated post-operative course, and the patient was subsequently immobilized with a wrist cast for 4 weeks. After 3 months of follow-up, the physical examination in the right wrist



Figure 2: Computed tomography arthrography: Completely intramedullary bone resorption of the capitate, as an empty recipient.

showed the following: Flexion 20° and extension 20°, and it was pronation- and supination-free. The patient presented no pain and was satisfied with the operation. The X-ray shows a stable prosthesis (Fig. 3). The 1-year follow-up X-ray (Fig. 4) shows a completely integrated prosthesis.

Discussion

Advanced stages of wrist osteoarthritis degeneration of the radiocarpal and midcarpal joints may cause painful wrist and can result in major functional impairment [8]. If conservative treatment fail, surgical treatments aim are pain relief, and if possible, preservation of wrist mobility and improvement of grip strength. Surgical possibilities are partial or total arthrodesis of the wrist, PRC, and prosthetic replacement. Partial arthrodesis is procedures that obtain good pain relief and provide good recovery of grip strength [9]. However, many complications were described, such as pseudarthrosis or residual pain [10]. Total wrist arthrodesis offers pain-free wrist but blocks all movements. Total wrist prosthesis, in an attempt to preserve motion, has complications such as implant failure and silicone synovitis [1]. PRC is a good pain relief and preserves motion, but its use is limited to cases in which the articular surface of the capitate is well-preserved [2]. The RCPI prosthesis extends the indications for PRC to osteoarthritis of the midcarpal joint and has shown promising results for pain reduction, wrist motion, and grip strength [3, 4, 5, 6]. In our case report, the use of PRC with RCPI in association with capitate bone graft for radiocarpal osteoarthritis and capitate affected by arthritis and with bone medullary resorption, showed satisfactory results in achieving pain relief and preservation of wrist mobility, avoiding a more radical treatment as arthrodesis.

Conclusion

Treatment of advanced carpal collapse with osteoarthritis of the midcarpal joint can be PRC with RCPI. However, when bone resorption of the capitate exists, surgical treatment usually is a wrist arthrodesis which is a good pain relief but blocks all movements. PRC with RCPI with bone graft can be a good alternative solution with pain relief and preservation of wrist mobility.

Clinical Message

PRC with RCPI is already a good treatment for painful SNAC wrist. This case report raises the question of extending its indication to more severe osteoarthritis cases to avoid more radical treatments.



Figure 3: (a and b) X-ray: Resurfacing capitate pyrocarbon implant and capitate bone graft 3 months post-operative.

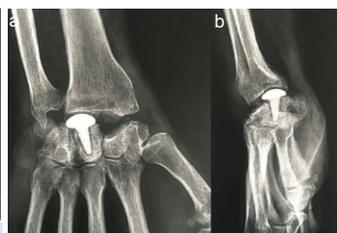


Figure 4: (a and b) X-ray: 12 months post-operative, completely integrated prosthesis.



References

1. Steenwerckx A, De Smet L, Zachee B, Fabry G. Proximal row carpectomy: An alternative to wrist fusion? *Acta Orthop Belg* 1997;63:1-7.
2. Tang P, Imbriglia JE. Osteochondral resurfacing (OCRPRC) for capitate chondrosis in proximal row carpectomy. *J Hand Surg Am* 2007;32:1334-42.
3. Goubier JN, Vogels J, Teboul F. Capitate pyrocarbon prosthesis in radiocarpal osteoarthritis. *Tech Hand Up Extrem Surg* 2011;15:28-31.
4. Szalay G, Stigler B, Kraus R, Böhringer G, Schnettler R. Proximal row carpectomy and replacement of the proximal pole of the capitate by means of a pyrocarbon cap (RCPI) in advanced carpal collapse. *Handchir Mikrochir Plast Chir* 2012;44:17-22.
5. Marcuzzi A, Ozben H, Russomando A. The use of a pyrocarbon capitate resurfacing implant in chronic wrist disorders. *J Hand Surg Eur* 2014;39:611-8.
6. Giacalone F, di Summa PG, Fenoglio A, Sard A, Dutto E, Ferrero M, et al. Resurfacing capitate pyrocarbon implant versus proximal row carpectomy alone: A comparative study to evaluate the role of capitate prosthetic resurfacing in advanced carpal collapse. *Plast Reconstr Surg* 2017;140:962-70.
7. Mathilde G, Abhijeet LW, Christophe M. Treatment of avascular necrosis of the proximal pole of the scaphoid by arthroscopic resection and prosthetic semireplacement arthroplasty using the pyrocarbon adaptive proximal scaphoid implant (APSI): Long-term functional outcomes. *J Wrist Surg* 2012;1:159-64.
8. Lulan J, Marteau E, Bacle G. Wrist osteoarthritis. *Orthop Traumatol Surg Res* 2015;101:S1-9.
9. Kendall CB, Brown TR, Millon SJ, Rudisill LE, Sanders JL, Tanner SL. Results of four-corner arthrodesis using dorsal circular plate fixation. *J Hand Surg Am* 2005;30:903-7.
10. Shindle MK, Burton KJ, Weiland AJ, Domb BG, Wolfe SW. Complications of circular plate fixation for four-corner arthrodesis. *J Hand Surg Eur* 2007;32:50-3.

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