Original Research Article

Functional Outcome in Patients Undergoing Sauve-Kapandji Procedure in the distal radioulnar joint disorders-A Mid Term follow up

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Abstract

Introduction: The Sauvé-Kapandji procedure is useful for treating a variety of pathologic conditions that alter the normal function of the distal radioulnar joint. The present study was aimed to evaluate the clinico-radiological outcomes of the sauve-kapandji procedure in various distal radioulnar joint disorders. **Materials and methods:** The study included 14 females and 4 males with a 5 years mean follow up. The mean age at time of surgery was 48 years (range 22-72). The indication for surgery was posttraumatic osteoarthritis in 10 patients, inflammatory arthritis in 5 patients, and painful DRUJ luxation in 3 patients. **Results:** At final follow-up, VAS and quickDASH scores showed statistically significant improvement from a mean of 5.3 ± 0.9 to 1.2 ± 0.6 and 48.6 ± 9.8 to 20.7 ± 4 respectively. Mean grip strength improved significantly from 3.5 ± 1.2 kg preoperatively to 6.4 ±1.6 kg postoperatively (P<0.005). There was a statistically significant improvement in the preoperative versus postoperative range of motion of the wrist and forearm. Radiologically, successful union at the arthrodesis site was noted in all patients. **Conclusion:** The Sauvé–Kapandji procedure is an established treatment method for distal radioulnar joint dysfunction. This study supports the pragmatic utility of the S-K procedure in treatment of DRUJ disorders with a significant clinical improvement.

Keywords: Sauve-Kapandji Procedure, DRUJ Instability, Arthodesis,QuickDASH

Introduction

Several surgical procedures have been proposed for the management of distal radioulnar joint (DRUJ) osteoarthritis, such as the Darrach procedure[1], the Sauvé-Kapandji (SK) procedure[2], hemiresection interposition arthroplasty[3] and implant arthroplasty[4,5]. The Sauvé–Kapandji procedure is an established treatment method for distal radioulnar joint dysfunction. The SK procedure consists of two procedures i.e. distal radioulnar joint arthrodesis and the creation of pseudarthrosis at the distal ulna[2]. We report our results in 18 patients who underwent the SK procedure with the special emphasis on clinic-radiological status and grip strength at 5 years mean follow-up.

Material and Methods

The retrospective study was done at a single tertiary care center hospital in 18 consecutive patients who underwent the SK surgery for DRUJ disorders. All the surgeries were performed by a single senior most surgeon. The detailed patient's records with respect to demographics, surgery details, pre and postoperative clinical data and complications were recorded and analyzed. Pain was evaluated using the visual analog scale (VAS) and the subjective assessment was done using the quick DASH scoring system. Range of motion and grip strength data were measured including wrist flexion/extension, radial and ulnar deviation, forearm supination, and pronation. Grip strength was recorded using a dynamometer in kilograms (Jamar, Cambridge, Massachusetts). Radiographs were reviewed for DRUJ arthrodesis site union, implant failure and bony bridge around the ulnar stump at time of final follow-up.

Operative Procedure

All procedures were carried out under regional block with tourniquet control.

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The patients were positioned supine with their arm on a hand table. A longitudinal incision is given over the dorsal-ulnar aspect of the wrist. The extensor retinaculum is exposed and approached through the fifth compartment. The distal ulna is exposed between the tendons of the flexor carpi ulnaris and extensor carpi ulnaris. The inferior radioulnar joint is then exposed, usually by incision of the joint capsule adjacent to the extensor carpi ulnaris tendon. The ulnar shaft with a length of 10–14 mm was resected proximal to the ulnar head, and the distal portion was left enough for screw placement. The cortex on the opposite side of the ulnar head to the radial sigmoid notch was removed. After confirming that the line of force is good by fluoroscopy, provisional stabilization of inferior radioulnar joint was done using 2 k wires followed by a definitive fixation using a single partially threaded screw. Cancellous bone (from the resected ulnar bone segment) is implanted at the radioulnar fusion site, followed by full compression of the screw. After joint fusion, ensure that the ulnar shaft defect gap is 10-12 mm, and if necessary, the osteotomy end can be further trimmed with an oscillating saw. The proximal ulnar stump was covered with periosteum and circumferential soft tissue meticulously and was not restricted by the tendon, such as the extensor or flexor carpi ulnaris[6]. Wound was closed in layers.The arm was kept in a long arm slab in a neutral position for 2 weeks followed by a removable forearm splint for another 4-6 weeks to be worn uninterruptedly except for functional training focusing on active wrist motion and forearm pronation and supination. Light strength training was started after 8 weeks, and heavy lifting and strong forearm twists are avoided for 3-4 months.

Results

The study included 14 females and 4 males with a mean of 5 year follow up. The mean age at time of surgery was 48 years (range = 22-72). The indication for surgery was posttraumatic osteoarthritis in 10 patients, inflammatory arthritis in 5 patients, and painful DRUJ instability in 3 patients. At final follow-up, VAS and quickDASH scores showed statistically significant improvement from a mean of 5.3 ± 0.9 to 1.2 ± 0.6 and 48.6 ± 9.8 to 20.7 ± 4 respectively at final

follow up. Mean grip strength improved significantly from 3.5 ± 1.2 kg preoperatively to 6.4 ±1.6 kg postoperatively (P<0.005).There was a statistically significant improvement in the preoperative versus postoperative range of motion of the wrist and forearm (Table 1).

Table 1: Clinical Outcome Of Sauve-Kapandji Procedure

Parameters	Pre-Operative Data (Mean±SD)	Post-Operative Data (Mean±SD)	P Value
QuickDash Score	48.6 ± 9.8	20.7 ± 4	< .05
Grip Strength(kg)	3.5 ± 1.2	6.4 ± 1.6	< .05
Wrist Motion(Degrees) Supination	56.5 ± 4	82 ± 3.5	< .05
Pronation	68 ± 3.7	75 ± 4.8	< .05
Extension	53.3 ± 6	65 ± 5.3	< .05
Flexion	44.2 ± 5.6	69.7± 4	< .05

Radiologically, successful union at the arthrodesis site was noted in all patients (Images1-2).

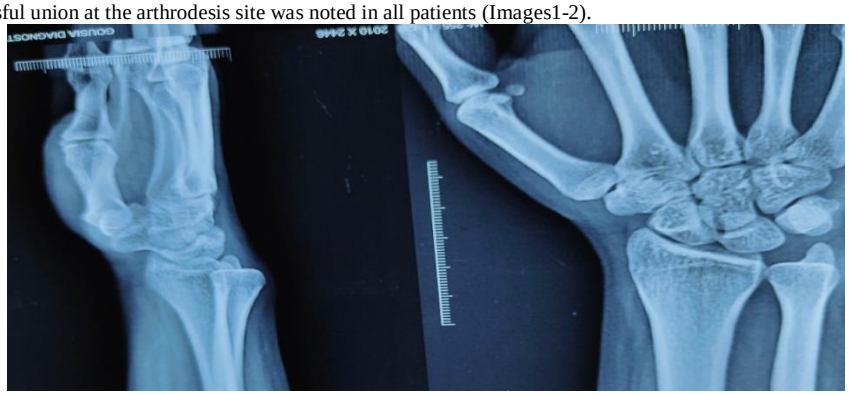

Figure 1: Xray showing DRUJ Instability

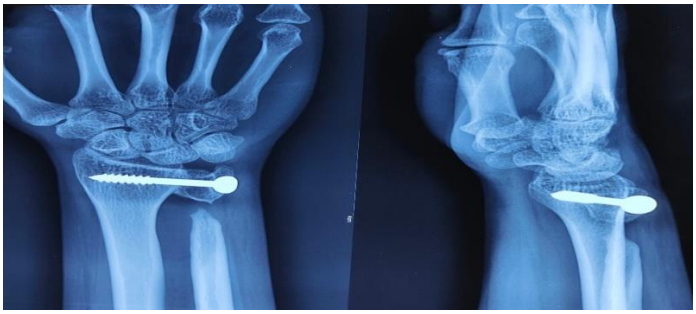

Figure 2: Final follow up X ray of Sauve-kapandji Procedure

There was no evidence of painful stump orany bony bridge around the ulnar stump.One patient had symptomatic implant and the symptoms improved after the implant removal (Image 3).

Figure 3: X Ray after removal of screw(implant)

Discussion

The DRUJ and triangular fibrocartilage complex (TFCC) form a unit and are keystones for the normal mechanics of the hand-forearm unit[7,8]. In 1921, Baldwin described a method of resection of a segment of the ulna, but without distal radioulnar arthrodesis[9]. In 1936 Louis Sauve and Mehmed Kapandji[2,9] modified Baldwin's

procedure and proposed an operation consisting of radioulnar joint fusion and a bony gap just proximal to the fusion, because it retains the ulnar head. The procedure has advantages of providing an uninterrupted surface for articulation with the carpal condyle, equalization of the ulna plus variance and a normal wrist contour with a more physiological pattern of force transmission from the hand to the forearm[8,10,11]. This study demonstrates that the S-K procedure shows statistically significant improvement in VAS score and quickDASH score for patients with DRUJ pathology at final follow-up. This was similar to other studies in the literature that further legitimize the pain relief achieved with the SK procedure[6,9,12,13,14]. This study demonstrated statistically significant improvement in grip strength after the S-K procedure. Improvement in grip strength was confirmed in several other studies[11,13,14,18] and is an important functional confirmation of pain relief and DRUJ stability[15,16]. In our study, the range of motion of the wrist and forearm i.e., supination, pronation, extension and flexion showed a significant improvement at the final follow up and the similar findings was noted in other studies also[17,18]. Radiographically, the union at the arthrodesis site was achieved in all cases. There were no complications like delayed union, nonunion at the arthrodesis site and painful ulnar stump. None of our cases had any bone bridge at the site of ulnar stump or ulno-radial instability. The limitations of our study are the retrospective nature of the study design, multiple DRUJ pathologies and the small sample size. Although there are multiple pathologies addressed in this series, this study supports the pragmatic utility of the S-Kprocedure in treatment of all DRUJ pathologies.

Declaration of Conflicting Interests

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