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Mini Review

Trapeziectomy with Ligament Reconstruction and Tendon Interposition- Differences in Results in Osteoarthritis and Rheumatoid Arthritis

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Introduction

Trapeziectomy with or without ligament reconstruction and tendon interposition is a popular surgical option in the treatment of advanced stage arthritis of the first CMCJ. The main goals of this procedure are to alleviate pain, increase stability, enhance mobility and ultimately, to improve function. The efficacy of this surgical procedure has been well described in world literature for basal joint osteoarthritis with good symptomatic relief and long-term results. The 1st CMCJ also tends to be involved in patients with rheumatoid arthritis and leads to pain and symptomatic subluxation. This problem leads to significant functional loss in patients with rheumatoid arthritis. Currently, there are very few studies which actually discuss the long-term outcome of excisional arthroplasty of the first CMCJ for patients with rheumatoid arthritis despite this procedure being used commonly for treatment of this condition. Therefore, the aim of our study was to investigate particularly into the results of this LRTI in patients with rheumatoid arthritis. Furthermore, we also aimed to see whether there was any difference in the results of this procedure performed for those with a diagnosis for rheumatoid arthritis compared to those with osteoarthritis.

Methodology

This study was conducted in Orthopaedics and Traumatology Department of Queen Mary Hospital, which is a university affiliated tertiary referral hospital in Hong Kong, China. A retrospective of review of out-patient records pre-operatively and during follow up, in-patient and occupational therapist's notes during follow up of patients who had undergone trapeziectomy with LRTI at this centre between the year 2002-2012. Patient interviews were conducted to assess patient's pre-operative and post-operative pain scores (scale from 0-10), functional score (Disabilities of the Shoulder and Hand - DASH), satisfaction with the procedure (score from 0-10 – 0 being completely dissatisfied and 10 being completely satisfied). They were also asked having undergone the procedure, whether they would choose to have the procedure again with the experience and knowledge they have now garnered. A review of pre-operative and post-operative notes taken by medical personnel as well as occupational therapists was also performed, and the pre-operative values of the patient's pinch and power grip was noted. These values at each follow up were also noted.

Results

Over the course of the study period a total of 22 patients and 27 thumbs underwent trapeziectomy and LRTI at our center. 20 patients were female and 2 were male. 10 patients had the diagnosis of rheumatoid arthritis and 10 had osteoarthritis. 16 of the operated thumbs belonged to patients in the osteoarthritis category and 11 were present in the rheumatoid arthritis group. The average age at the time of operation was 62 years for the osteoarthritis group and 57 in those with rheumatoid arthritis. The flexor carpi radialis was utilised as the interpositional material in twenty-four thumbs, the palmaris longus in two and the abductor pollicis longus in one thumb.

Severity of Basal Joint Osteoarthritis

A review of patient's pre-operative X-ray films of the hand was also performed and staged according to the Eaton-Littler classification. Of the patients in the osteoarthritis group, 6.2% had stage 2 disease, 25% had stage 3 disease and 68.8% suffered from stage 4 disease (Figure 1).

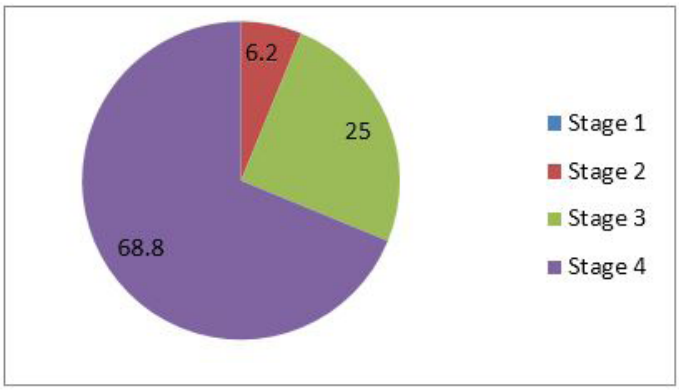

Figure 1: Chart showing distribution (%) of severity of osteoarthritis according to the Eaton Littler Classification.

Indications for Operation

Pain was the major indication for operation in all our patients with osteoarthritis. Whereas for our patients in the rheumatoid arthritis group, 45% underwent the procedure primarily due to pain, 36.4% for the reason of pain associated with thumb symptomatic subluxation and 18.2% for painless CMCJ dislocation which led to functional impairment from narrowed web space and weakness.

Pain

The average pre-operation pain score was 7.18 in the RA group and 7.8 in the osteoarthritis group. The average post-operation pain score was 1.09 in those with rheumatoid arthritis and 2.77 in those with osteoarthritis. The percentage decrease in pain score was 84.8% (p=0.005) and 64.8% (p=0.001) for the RA and OA groups respectively (Table 1).

Group	Mean pre-op VAS	Mean post-op VAS	Percentage change	Signifi cance
RA	7.18	1.09	84.8% decrease	P=0.005
OA	7.8	2.77	64.8% decrease	P=0.001

Table 1: Table showing mean pre-operative and post-operative VAS pain scores for rheumatoid arthritis and osteoarthritis patients.

Pinch Grip: 75% of the patients in the osteoarthritis group experienced a decrease in pinch grip at 3 months post-operation with the proportion of patients increasing to 100% at 6 months and leveling off to around 50% of patients at 9 months. However, for patients with rheumatoid arthritis, despite an initial 66.7% of patients experiencing a decrease in the pinch grip at 3 months post-operation, this gradually improved to 66% of patients actually experiencing an increase in the pinch grip value compared to pre-operative measurements at 9 months.

Power Grip: Nearly all patients in the osteoarthritis group experienced a decrease in the power grip values compared to the pre-operative values of the same hand at 3,6 and 9 months. However, in patients with rheumatoid arthritis, at 3 months, 60% of patients had a decrease and 40% had an increase in their power grip strength. At 6 months however, the proportion of patients with an increase in power grip increased to 60% and the proportion of patients with worsening of the power grip decreased to 20% and 20% were the same as their pre-operative measurement. The proportion of patients with either an increase, decrease or similar power grip values were similar to that at 6 months at 50%, 33% and 17% respectively. Furthermore, when we looked at the actual percentage change in mean power grip of our cohort of RA patients, we saw an initial decrease in the mean power grip at 3 months followed by a trend of increase at 6 and 9 months at 43.3% (p=0.141) and 55.2% (p=0.144) respectively (Table 2).

Time	Mean power grip (kg)	Percentage change compared to pre-op	Signifi cance
Pre-op	6.7		
3 months	5.3	-20.9	p=0.5
6 months	9.6	+43.3	p=0.141
9 months	10.4	+55.2	p=0.144

Table 2: Table showing change in power grip during post-operative course for rheumatoid arthritis group.

Function

The average pre-operation DASH score was 38.89 in those with RA and 38.3 in those with OA with the mean post-operation DASH score being 14.57 and 28.3 respectively. The percentage decrease in DASH scores was 62.5% (p=0.013) and 26.1% (0.117) for RA and OA groups respectively.

Diag nosis	Mean pre-op DASH	Mean post-op DASH	Percentage change	Signifi cance
RA	38.89	14.57	62.5% decrease	p=0.013
OA	38.3	28.3	26.1% decrease	P=0.117

Table 3: Table showing pre-operative and post-operative DASH scores for osteoarthritis and rheumatoid arthritis patients.

Patient Satisfaction

Patient satisfaction taken as a score out of 100 was higher in the RA group compared to those in the OA group (77.2 v.s. 73 respectively). More patients in the RA group opted to repeat the same procedure again if given the choice to do so (90.9% v.s. 84.6% respectively).

Discussion

According to the natural history of disease of arthritis of the first carpometacarpal joint space narrowing, development of osteophytes, subchondral sclerosis and cysts occur subluxation as well of the CMCJ. The basis behind ligament reconstruction

and tendon interposition for treatment of arthritis of the first carpometacarpal joint is to remove the diseased joint surface and to restore a good bony alignment to achieve stability. The results of our study show that patients with rheumatoid arthritis tended to have a better outcome in terms of decrease in pain; improvement in function as well as patient reported satisfaction scores. This phenomenon could be attributed to a number of factors. Firstly, it is highly likely to the patients in the OA group tended to be more active individuals and therefore have high expectations regarding the results of the procedure in improving their functional status post-operatively. Therefore, due to their high functional demand, satisfaction scores were lower.

In rheumatoid arthritis, progressive erosion and joint subluxation results which significant deformity and disability. LRTI restores alignment and therefore, the normal muscle pull is restored. This may explain the finding of improvement in pinch grip and function score in the rheumatoid arthritis patients. As joint subluxation is not a part of the pathophysiology of osteoarthritis of the first CMCJ, this may explain why improvement in pinch or power grip was not noted in our patients with osteoarthritis. The main weakness of our study lies in the fact that it was a retrospective study and that that scoring given by our patients with regards to the pre-operative levels of pain and disability relied heavily on the patient's memory of their own pre-operative level. A number of factors could therefore have influenced the patient's perception of their pre-operative condition e.g. patient's satisfaction with their current condition. Another weakness of our study is that the patient demographics and characteristics of our two groups of patients are different and have not been matched. Therefore, it may be difficult to draw direct comparisons between these two groups. To avert this issue, we have analysed our data as to allow comparison of the two groups by first looking at the difference in the pre- and post-operative condition within that group and then comparing this difference. Furthermore, there were missing pieces of data particularly for some of the measurement values for pinch and power grip owing to the retrospective nature of our study.

Conclusion

LRTI is an effective procedure for treatment of end stage arthritis of the first carpometacarpal joint in terms of improving pain and function with high patient satisfaction scores for both patients with osteoarthritis and rheumatoid arthritis. Additionally, LRTI is also capable of improving pinch and power grip of patients with rheumatoid arthritis involving the first carpometacarpal joint.