

Long term results in refractory tennis elbow using autologous blood

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Abstract

Tennis elbow (TE) is one of the commonest myotendinosis. Different treatment options are available and autologous blood injection has emerged as the one of the acceptable modalities of treatment. Long term studies over a larger group of patients are however lacking. The purpose of this study was to evaluate these patients on longer durations. One-hundred and twenty patients of TE, who failed to respond to conventional treatment including local steroid injections were taken up for this prospective study over the period from year 2005 to 2011 and were followed up for the minimum of 3 years (range 3-9 years). Two mL of autologous blood was taken from the ipsilateral limb and injected into the lateral epicondyle. The effectiveness of the procedure was assessed by Pain Rating Sscale and Nirschl Staging, which was monitored before the procedure, at first week, monthly for first three months, at 6 months and then 3 monthly for first year, six monthly for next 2 years and then yearly. Statistical analysis was done and a P value of <0.05 was taken as significant. The patients (76 females and 44 males) were evaluated after procedure. The mean age group was 40.67±8.21. The mean follow up was 5.7±1.72 (range 3 to 9 years). The mean pain score and Nirschl stage before the procedure was 3.3±0.9 and 6.2±0.82 respectively. At final follow up the pain score and Nirschl were 1.1±0.9 and 1.5±0.91 respectively. Autologous blood injection was found to be one of the modalities for treatment of TE. Being cheap, available and easy method of treatment, it should be considered as a treatment modality before opting for the surgery. Universal guidelines for the management of tennis elbow should be made as there is lot of controversy regarding the treatment.

Introduction

Wheel has turned full cycle for Tennis elbow. Previously known as the disease of athletes, it is now well known more for non-athletes. Male and female are equally affected. Diagnosis is

simple but often delayed. Incidence is increasing among the general population owing to the awareness about this condition. Conservative management is helpful in many cases, but not in all. Minimally invasive techniques, local steroid injections, ultrasonic therapy, EST, bracing and physiotherapy have been tried with variable success. Surgery is often the last option. The global burden of this disease condition is high. Lot of studies have been done on the refractory tennis elbow, which does not respond to conventional conservative management and local steroid injections. Autologous blood injection (ABI) has emerged as an effective armamentarium in the hands of orthopedics and has shown promising results but the studies have usually less number of patients or shorter follow up. Our study in 2006 about the initial experience with this procedure was subsequently followed at our institute.¹ The current study was aimed at evaluating the long term efficacy of autologous blood injection in large series of patients who had either no relief with non-surgical procedure or the recurrence of symptom resulted in reluctance for repeating the previous procedure and agreed for this treatment modality before being considered for surgery.

Study design

This is a level IV prospective study conducted at Tertiary level orthopedic trauma care center.

Materials and Methods

From year 2005 to year 2011, five-hundred and forty patients of Tennis elbow were treated in the out-patient department of orthopedics. Conservative management was started in all and all were subsequently followed. One-hundred twenty (120) patients did not respond to any of the treatment methods including analgesics, bracing, physiotherapy, activity modifications or local steroid injection (this includes twenty six patients of our previous series who received the ABI in 2006 and their response was published in 2006). Patients with coexisting pathology *i.e.* rheumatoid arthritis of elbow, cervical radiculitis, trauma around elbow, surgical treatment for lateral epicondyle and patients who had received steroid injection within 3 months were all excluded from study. The study was approved by ethical committee.

One hundred twenty patients, 76 females (63.33%) and 44 male patients (36.66%) were taken up for autologous blood injection. Right side was involved in majority (n=102) of cases, which was the dominant hand in 85% of cases. Mean age group was 40.67±8.21 (range 20-60) and average duration of symptoms were 4 months to 2.5 years.

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Two mL of venous blood was drawn from the ipsilateral upper-limb. It was then injected into the lateral epicondyle starting proximally and going along the supracondylar ridge up to the under surface of ECR. No anesthetic agent was used. Arm sling was used for a week. Patients were advised to follow up regularly.

The procedure was done by one of the authors. Patients were then asked to follow up regularly for 3 months after first injection as to see if another injection is required. Thirty six patients were given two injections. After one year, patients were followed at six months interval for first 3 years and then yearly till the completion of study. Minimum follow up of 3 years was taken up and the oldest case had a follow up of 9 years. Mean follow up was 5.7±1.72 (range 3 to 9 years). The effectiveness of the procedure was assessed by Pain rating scale and Nirschl staging which was monitored before the procedure, at first week, monthly for first three months, then 3 monthly for first year, then six monthly for next 2 years and then yearly. Statistical analysis was done and a P-value of <0.05 was taken as significant.

Results

One-hundred and twenty patients (76 females and 44 males) were evaluated after procedure. As far occupation is considered 54 females were house wives, 15 were office workers, two were dentists and five were college students. Among males thirty four were manual laborers including carpenters and butchers. Seven were office workers and three were col-

lege students (Table 1). All the college going students (5 females and three males) were using two wheelers for transportation. The mean age group of patient was 40.67 ± 8.21 . The mean follow up was 5.7 ± 1.72 (range 3 to 9 years). The mean pain score and Nirschl stage before the procedure was 3.3 ± 0.9 and 6.2 ± 0.82 respectively. At final follow up the pain score and Nirschl were 1.1 ± 0.9 and 1.5 ± 0.91 respectively. Correlation between the two at different times of follow up is given in Figure 1.

There was no gender difference in the response to procedure, nor was there any difference in dominant vs non-dominant hand. Maximum pain relief was seen during the first six months.

At the completion of study 85% (n=102) of patients were satisfied with the procedure. 80% were satisfied at the end of first six months ($P < 0.05$) which then increased to 85% at the end of 3 years.

Seven cases (5.83%) were operated for the release and debridement of ECRB. Eleven (9.16%) cases refused for surgery. These cases had taken multiple steroid injections (more than five and up to eleven)

No patient was given a local steroid after the autologous blood injection.

Complications

Although no major complication was noted during this procedure, we had some minor complications during the initial period of this study. Twelve patients reported post injection pain which subsided in 1-2 days. Two patients reported ecchymosis over the lateral aspect of forearm which subsided in a weeks' time after giving rest to the part.

Discussion

In 1928 G.P. Mills quoted the golden words for tennis elbow, *There is probably nothing which brings the surgical profession into greater discredit at the present times than the*

*inability to cure the tennis elbow.*² Are these words still holding true? Only time will answer. Perhaps he was correct in his era but lot of things have changed since then. The theory of persistent inflammation as the cause of tennis elbow was disproved by Nirshl in 1979.³ Years passed and in 1992 Regan *et al.* supported the theory of angiofibroblastic tendinosis in a cadaveric study.⁴

The role of mitomorphogenic factors of blood in the healing of degenerated tendon lead to the advent of autologous blood injection therapy for tennis elbow. Edwards and Calandruccio summarized the advantages of autologous blood injection for the treatment of refractory lateral epicondylitis in their excellent work on the subject.^{1,5-8} Its application being minimally traumatic, reduced risk of immune mediated rejection, simple to acquire and prepare and inexpensive are the other

advantages. Although local steroid injection treatment for lateral epicondylitis is well documented,^{9,10} its advantage over autologous blood is debatable.^{7,8} Varying results are published by the studies on long term follow up.¹⁰⁻¹² Comparative studies are few but have shown the better long term results with ABI.^{7,8} PRP has been shown to give good results and few studies have shown it to be better than ABI on long term follow up.^{13,14}

We published our experience of ABI in the year 2006,¹ which was then compared by many authors around the globe with their studies on a positive note.¹⁵⁻¹⁷ Messe *et al.*¹⁸ in his study showed the effectiveness of ultrasound guided ABI and wrist immobilization on 38 patients. He was satisfied with the treatment and the patient satisfaction in his cohort. Kaziem *et al.*⁸ in his study also showed good results with ABI as compared to local steroid injection.

Table 1. Summary of patients' characteristics.

	N.	%
Females (n=76)		
House wives	54	71.05
Office workers	15	19.73
College students	5	6.57
Dentists	2	2.63
Males (n=44)		
Manual labourers*	34	77.27
Office workers	7	15.90
College students	3	6.81

*Including butchers and carpenters.

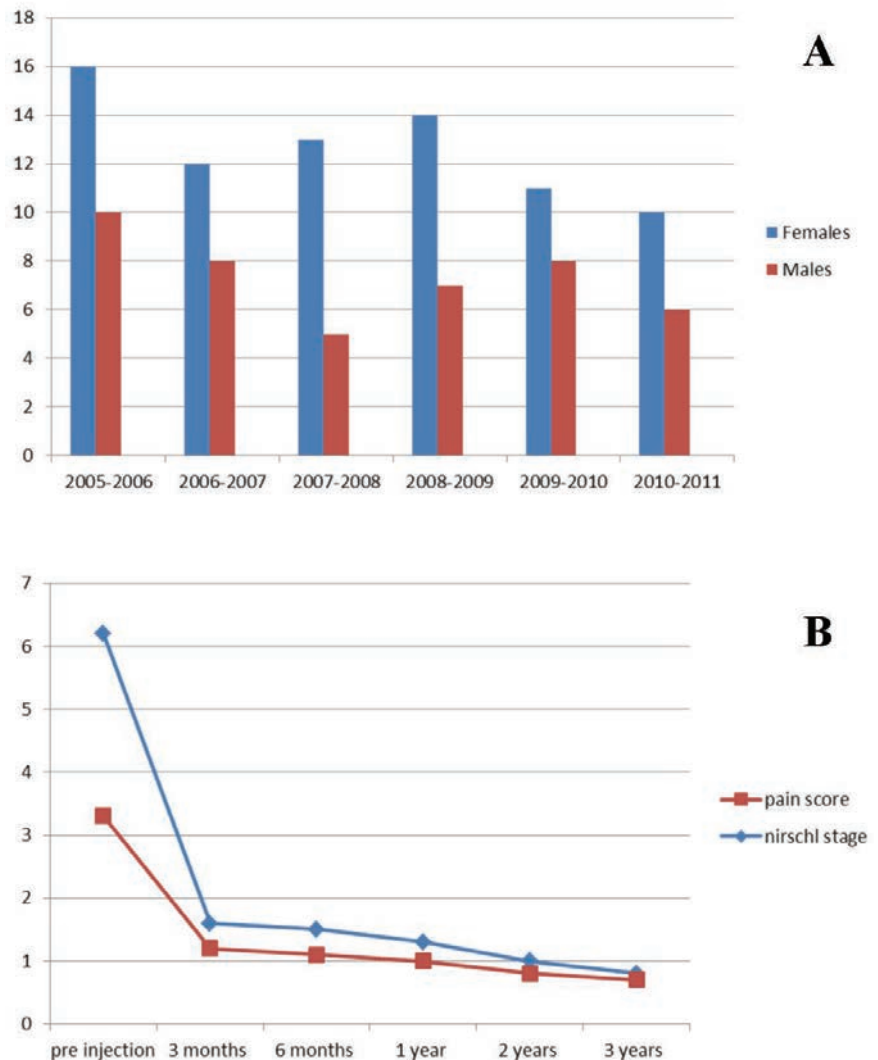


Figure 1. A) Number of procedures per year; B) correlation between pain score and Nirschl stage.

Table 2. Pain score, Nirschl staging and patients' satisfaction before and after injection.

	Before injection	After 6 months	After 1 year	After 3 years
Pain score	3.3±0.9	1.2±0.82 (P<0.05)	1.2±0.85	1.1±0.9
Nirschl staging	6.2±0.82	1.75±0.91 (P<0.05)	1.75±0.85	1.5±0.91
Patient satisfaction	0	80% (P<0.05)	80%	85%

Table 3. Comparison between our case and the other studies.

Study	Year	Patients, n.	Intervention	Results
Gani ¹	2007	26	1-2 ABI	Nirshl 3.3 to 1.2; pain score 5.5 to 3/10
Edwards <i>et al.</i> ⁵	2003	28	1-3 ABI	22/28 complete pain relief
Conell ⁶	2006	35	One ABI with needling under guidance	All improved
Saldana ²¹	2003	39	One ABI	10 healed
Dehghani ²²	2009	22	One ABI	Pain score 44 to 9
Bharti ²³	2010	25	One ABI	23 good or excellent results
Present study	2007-2011	130	1-2 ABI	85% satisfied

ABI, autologous blood injection.

However short term effects of local steroid were better than the ABI. He however, concluded that visible drug injection may have psychological effect over no drug in autologous blood injection. Rabago *et al.*¹⁹ in the systemic review of four injection therapies; prolotherapy, polidocanol, whole blood and platelet-rich plasma for tennis elbow concluded that there is strong pilot-level evidence supporting the use of all four types of injection therapies for the treatment of tennis elbow. de Vos *et al.*²⁰ in his study was more satisfied with PRP than ABI but the difference in the hospital set-ups, population catering, resources, health care policies and socio economic conditions of the patient forced us to focus on the treatment which is cheaper and acceptable to all. ABI answers our all concerns and we persisted with the same over a period of time.

Despite good results in our study we operated seven cases (5.83%) for the release and debridement of ECRB. Eleven (9.16%) cases refused for surgery.

This study on chronic patients shows positive medium and long-term results from a single or two injections of autologous blood and is the longest series in the English literature. The injection under accompanying treatments like splinting, and occupational therapy is free of adverse events.

This study was slightly different to past studies because of the larger number of patients and the longer follow up. One limitation of this study was the absence of randomization into a control group. The reason for this was that most patients were housewives or manual laborers and we could not deny the injection to those with chronic and resistant symptoms. The detailed description of our study and comparison with other studies is given in Tables 2 and 3.²¹⁻²³

Most of our patients got maximum relief during the first six months of injection. Thirty six patients were given repeated injections and also showed good response. These cases needed some lifestyle modifications and were happy with the results after one year. Our study has more female population as most of our cases were housewives who were involved in lot of traditional and cultural activities like manual cleaning of clothes which involve lot of squeezing, rinsing and brushing, traditional manual grinding of spices at home and brooming. It was also the matter of concern that most of these females could not give rest to the part as they are in most cases the whole care takers of the family and are indulged in activities which keep the forearm pronated and wrist extended leading to the precipitation of the symptoms.

Conclusions

Autologous blood injection is one of the modality of treatment for TE. Being cheap, available and easy, it should be considered as a treatment modality before opting for the surgery. Patient centered institutional rehabilitation policies should be made for the TE patients for the better results of ABI. Universal guidelines for the management of tennis elbow should be made as there is lot of controversy regarding the treatment.

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