

POLYPROPYLENE GRANULOMA AFTER ZONE 1-5 EXTENSOR TENDON REPAIRAshok Ramakrishnan¹, Mohammed Sageer²¹Assistant Professor, Department of Orthopaedics, Government Medical College, Trivandrum.²Additional Professor, Department of Orthopaedics, Government Medical College, Trivandrum.**ABSTRACT****BACKGROUND**

Extensor tendon injuries are common cases seen in any orthopaedic outpatient department. In general, the consequences of repair of extensor tendon injuries are considered favourable with minimal postoperative complications and residual deformities. One of the rare complications seen is a foreign body granuloma occurring at the suture site. This poses a diagnostic challenge to the surgeon as it may be a delayed presentation.

MATERIALS AND METHODS

Fifteen patients presenting with swelling at suture site and discharging sinus from the suture site after their extensor tendon injuries of hand were sutured with polypropylene formed the study group.

RESULTS

Removal of suture and debridement with primary closure resulted in resolution of symptoms.

CONCLUSION

In the event of foreign body granuloma, exploration, debridement and removal of sutures seem to be an adequate procedure, which gives predictable and favourable results. When dealing with tendon repair in areas with minimal subcutaneous tissue, it is advisable not to leave suture ends so that it irritates the skin and may lead to foreign body granulomas.

KEYWORDS

Extensor Tendon Injury, Foreign Body Granuloma, Polypropylene Sutures.

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BACKGROUND

Late complications of extensor tendon injuries are rare. Patient presenting with swelling and discharge from wound site months to even years after the index procedure poses a unique dilemma for the treating surgeon. A clinical evaluation of fifteen cases of suture site granuloma following repair of extensor tendon injuries of fingers (zones 1-5) was done during the period from January 2010 to September 2016.

Objectives of the Study

Postoperative foreign body granulomas are one of the rare complications of extensor tendon injuries of hand. The aim of this study is to find out the reason for these postsutural foreign body granulomas after suturing with polypropylene suture material and suggest remedial measures.

MATERIALS AND METHODS

Fifteen patients who attended the Orthopaedic Outpatient Department over a period of 5 years from January 2011 to

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September 2016 were included in the present study. Patients who presented with swelling at suture site and discharging sinus from the suture site after their extensor tendon injuries of hand were sutured with polypropylene formed the study group.

Inclusion Criteria

Patients who underwent zone 1-5 extensor tendon repair primarily presenting with discharge and swelling from suture site after a minimum period of two months.

Exclusion Criteria

Patients under 18 years, those with other injuries in same limb, those not willing for follow up, injuries in any other zone, those who underwent staged repair or had poor skin status requiring graft or a flap cover were excluded from the study.

Procedure

All patients were assessed with x-rays, blood investigations like CBC, ESR and CRP and blood sugar evaluation. All patients underwent exploration and debridement of the swelling under local anaesthesia as an outpatient procedure.

In each case, the patient had polypropylene suture, which was located subcutaneously and was excised and the scarred tissue was debrided. Cultures and histopathology specimens were sent in all cases.



All patients were given one dose of second generation cephalosporin antibiotic preoperatively followed by a course of five days of oral antibiotics.

Patients were in the age group of 20 to 45 yrs. The earliest presentation, which was seen was five months following the index procedure. The most delayed presentation was four years after the procedure.

Seven cases were work site injuries. Four were road traffic accidents and the other four were assaults with sharp weapons. None of the patients were immunocompromised. Microbial cultures were negative in all cases. Histopathology reports were similar in all these cases suggestive of acute or chronic inflammation correlating with a foreign body granuloma.

RESULTS

The earliest presentation was at five months after the procedure and the most delayed presentation was after four years.

In the current study, 10 cases were zone 4 injuries, four in zone 2 and one in zone 5.

Nine were reported as partial injuries and six were complete injuries.

Record of size of sutures was available in only in eight cases and it was size 3-0 polypropylene.

Seven patients were in the age group 20-30, five were in age group 30-40 and three were in age group 40-45.

Twelve were males and three patients were females. Dominant hand was involved in all cases.

All patients had evidence of a prominent polypropylene suture at the site of the swelling.

Removal of suture and debridement with primary closure resulted in resolution of symptoms. All cases were followed up for a period of minimum six months with no recurrence of symptoms in any. Bacterial cultures were negative in all cases. Histopathology showed chronic inflammation and giant cells, which was suggestive of foreign body granulomas.

DISCUSSION

Late complications of extensor tendon injuries are rare and predictable results are obtained following extensor tendon repair provided adherence to proper surgical technique are adhered to.¹ Polypropylene is a non-absorbable suture. Polypropylene was developed in 1970 as a first synthetic non-absorbable suture. It is a monofilament suture. Polypropylene has a tensile strength more than nylon. It can easily pass through tissues and induces minimal host response. It does not adhere to the tissues. This characteristic makes it an ideal tendon suture material. Its advantages as a suture material include non-reactivity with tissue and durability. However, they are fragile, expensive and difficult to manoeuvre compared to standard nylon sutures. Immediately, after a tendon repair, the tendon contributes nothing to the strength of repair. During that time, the suture itself and suture technique are the sole contributors to the strength of repair. So, suture selection is a key factor for success of repair.²

A foreign body reaction is different from an allergic reaction, which tends to occur early and can be differentiated from delayed foreign body reaction by skin hypersensitivity testing.³

The presence of these sutures in areas with minimal subcutaneous fat tends to produce irritation, and hence, foreign body granulomas.

Granuloma is defined as organised collection of macrophages or histiocytes usually arising in response to an infectious pathogen or foreign or unknown substance. Foreign body is any exogenous substance not inherently native to the body (e.g. suture material).

Polypropylene granulomas are reported in literature following hernia repair, eye surgeries⁴ and tendo Achilles surgeries.⁵ To identify and know about the chance of polypropylene granulomas is important clinically because they can be misdiagnosed as soft tissue tumours like sarcomas. The late presentation of the condition compounds the difficulty of diagnosis.

The dorsum of the hand, wrist and forearm are divided into the following nine anatomic zones to facilitate classification and treatment of extensor tendon.⁶

Zone 1 (Distal Interphalangeal (DIP) joint); Zone 2 (middle phalanx); Zone 3 (Proximal Interphalangeal (PIP) joint); Zone 4 (proximal phalanx); Zone 5 (Metacarpophalangeal (MCP) joint); Zone 6 (dorsum of hand); Zone 7 (wrist); Zone 8 (distal forearm); Zone 9 (proximal forearm).

General complications of extensor tendon injury include infection and tendon rupture.

Risk of adhesions following tendon repair that decrease wrist mobility and impair finger movement is common in zone 7 and 8.⁷ Zone 6 complications include retraction from the initial site of injury (less likely than zones 7 and 8) and excess shortening of the tendon following repair. Zone 5 complications include infection (injury often secondary to human bite) and subluxation of the extensor digitorum communis. Zone 4 complications include damage to the gliding layer located between the tendon and bone. Zone 3 complications include boutonniere deformity. Zone 1 and 2 complications include mallet deformity, swan-neck deformity and skin ulceration secondary to splint.⁸ Zone one to five is a subcutaneous zone with minimal soft tissue cover. This maybe the reason that suture irritation of skin produces foreign body granulomas in these regions.

It is stressed that suture granulomas should be prevented by skillful wound closure based on proper knowledge of the physical characteristics of the wound, meticulous surgical technique- burial of knot and proper selection of sutures. Though suture granuloma following surgeries is not a serious complication, it is easily preventable by understanding the risk factors, the nature of the suture material and the technique of wound closure.⁹

Awareness of possibility of suture granulomas is essential because they can mimic serious conditions like malignancies.^{10,11}

Suture techniques described for extensor tendon injuries are mainly modified Kessler or modified Bunnell technique. More recently, interest has focussed on an interlocking mattress suture.¹² Despite the comparative ease of surgical access, extensor tendon repair is technically demanding in all zones of injury.¹³

When doubtful of diagnosis, ultrasound evaluation will help in identifying suture granulomas. On ultrasound, a hypoechoic collection with a small hyperechoic structure in the collection (the suture) is highly specific. It often has parallel hyperechoic 'rail-like' morphology and may show mild vascularity on colour Doppler.¹⁴

On MRI, suture granulomas have a hypointense rim that corresponded to the fibrous wall on a T2-weighted MR image and show persistent peripheral enhancement that corresponded to the granulation tissues and fibrous wall on dynamic MR images.¹⁵

Its worthwhile to note that suture granulomas can present as enhancing masses on MRI or CT and can be associated with increased uptake at F-18 fluoro deoxy glucose (FDG)-Positron Emission Tomography (PET)/CT imaging.^{16,17}

CONCLUSION

In the event of foreign body granuloma, exploration, debridement and removal of sutures seem to be an adequate procedure, which gives predictable and favourable results. Investigations like MRI, ultrasound or x-rays are not essential in such situations.

When dealing with tendon repair in areas with minimal subcutaneous tissue, it is advisable not to leave suture ends so that it irritates the skin and may lead to foreign body granulomas.

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