Brunei International Medical Journal

OFFICIAL PUBLICATION OF THE MINISTRY OF HEALTH, BRUNEI DARUSSALAM

Volume 15 22 March 2019 (15 Rejab 1440H)

SUBCUTANEOUS MIGRATION OF SILICONE ROD: COMPLICATION OF 2-STAGE FLEXOR TENDON RECONSTRUCTION.

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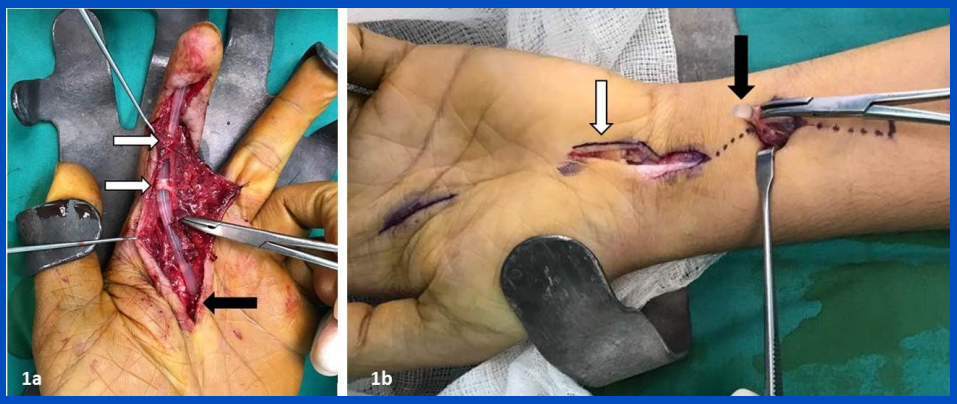

ABSTRACT

A 2-stage flexor tendon reconstruction is the current accepted treatment method for a chronic flexor tendon injury. This involves placement of a silicon rod to allow a pseudosheath tunnel to form around the rod which is then follow by replacement of the silicon rod by a tendon graft placed inside the pseudosheath tunnel after three months. Complications such as migration of the silicone rod have been previously reported. We reported here our first case of a patient who underwent the first stage procedure but developed silicon rod migration up into the forearm within three months of implantation, resulting in failure of formation of the pseudosheath. He required three operative procedures in total as it was necessary to repeat the first stage again thus delaying the treatment progress.

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Brunei Int Med J. *2019;15:40-43*

ISSN 1560 5876 Print
ISSN 2079 3146 Online

Online version of the journal is available at www.bimjonline.com

Brunei International Medical Journal (BIMJ)
Official Publication of the Ministry of Health, Brunei Darussalam

ISSN 1560-5876 Print
ISSN 2079-3146 Online

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ABSTRACT

A 2-stage flexor tendon reconstruction is the current accepted treatment method for a chronic flexor tendon injury. This involves placement of a silicon rod to allow a pseudosheath tunnel to form around the rod which is then follow by replacement of the silicon rod by a tendon graft placed inside the pseudosheath tunnel after three months. Complications such as migration of the silicone rod have been previously reported. We reported here our first case of a patient who underwent the first stage procedure but developed silicon rod migration up into the forearm within three months of implantation, resulting in failure of formation of the pseudosheath. He required three operative procedures in total as it was necessary to repeat the first stage again thus delaying the treatment progress.

Keywords: Complications, Foreign body (Silicon rod) migration, Reconstructive surgical procedures (2-stage flexor tendon reconstruction), tendon injury.

INTRODUCTION

Neglected or missed diagnosed flexor tendon injuries result in tendon retraction or adhesions which poses a problem for tendon repair and grafting. An immediate insertion of a tendon graft in these situations may result in adhesions of the tendon to the underlying tendon bed. Therefore, it is recommended to perform a 2-stage flexor tendon reconstruction procedure by inserting a silicon rod in the first stage, to allow a pseudosheath tunnel to form around the rod during a period of three months. Once this tunnel has formed, a tendon graft is then inserted during the second stage procedure, which will then glide easily in the pseudosheath tunnel.[1] Satisfactory functional outcomes have been reported by majority of patients who have undergone this time-tested procedure.[2-4]

Silicon rod migration is a fairly uncommon complication of a 2-stage flexor tendon reconstruction procedure. In most cases reported, the rod commonly migrated just within the palm and rarely into the forearm.[5,6] We report a case of silicon rod migration up into the forearm in a patient who had undergone the first stage procedure, resulting in failure of formation of the pseudosheath tunnel and requiring in total three procedures to complete the flexor tendon reconstruction. Our objective is to inform others that the rod migrating into the forearm is a possibility and

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it is not required to perform a carpal tunnel release as the rod lies subcutaneously.

CASE REPORT

A 27-years-old male was referred to our Department with chronic flexor tendon injury nine months after sustaining a knife cut in flexor zone II of the left index finger. His initial injury was treated at another centre with a primary tendon repair which was later complicated by adhesion for which he underwent multiple attempt of adhesiolysis. Clinically, he was able to actively flex the left index finger metacarpo-phalangeal joint (MCPJ) from 0 – 90 degrees with minimal active flexion ranging from 0 – 10 degrees at the proximal (PIPJ) and distal inter-phalangeal joints (DIPJ). However, he had full passive motion of the joints. We decided to perform a two-stage flexor tendon reconstruction.

During the initial first stage procedure, we noted dense adhesions surrounding the flexor digitorum profundus (FDP) tendon with fibrous tissue within the pulleys and absent A2 pulley. The FDP was intact but shortened with obvious bow-stringing. Since the patient has had three surgeries before, we decided to cut the FDP at the distal insertion and folded onto itself at zone III. The A2 pulley was reconstructed using part of the palmaris longus and we inserted a 4-mm silicone rod and anchored the distal part to the remaining stump of the FDP with multiple non-absorbable sutures (Prolene™ size 4/0, Ethicon Inc., Georgia, USA). The rod was tunnelled into the A4 and A2 pulleys, then proximally placed in zone III (Figure 1). The patient was then discharged well and continued physiotherapy on an outpatient basis to maintain joint mobility.

After three months, the patient underwent the second stage procedure. The previous palmar incision was reopened and explored proximally up till the distal part of the carpal tunnel but was unable to locate the rod. We suspected that the rod had migrated up but a carpal tunnel release carried out also failed to locate the rod. Exploration was carried out even more proximally up to the flexor tendons in the space of Parona but again the rod could not be located. Finally, we found it migrated subcutaneously at the distal third of the forearm approximately 21 cm from its original position (Figure 1b). Due to the migration, there was a failure of formation of the pseudosheath at the finger and palm. Thus, we decided to redo the first stage procedure and re-anchored the silicone rod with larger and additional sutures at the pulleys of the stump of the FDP in the finger, in a similar manner to the initial surgery.

The patient underwent gentle physiotherapy to maintain passive motion post-operatively. On further questioning, he admitted to carrying heavy boxes in the immediate post-operative period after the initial first stage surgery and this may have cause the migration of the silicon rod into the forearm. After another three months, the second stage procedure was successfully carried out to reconstruct the tendon using a palmaris longus tendon autograft with pull-out suture fixation at the base of the distal phalanx using non-absorbable suture (Prolene™ size 4/0, Ethicon Inc., Georgia, USA). Post-operative care consisted of passive range of motion exercises with the hand placed in a dorsal backslab with the wrist in neutral and the MCPJ at 90 degrees for a period of three weeks.

At two weeks post-operative follow up, the pull-out sutures was noted to have accidentally dislodged off. Ultrasound of the left index finger however confirmed that the tendon graft was still intact and attached to the distal phalanx. Finger extension exercise was then started as tolerated for a further three weeks followed by strengthening exercises. At four months post-operatively, the patient was reviewed in clinic and we noted a

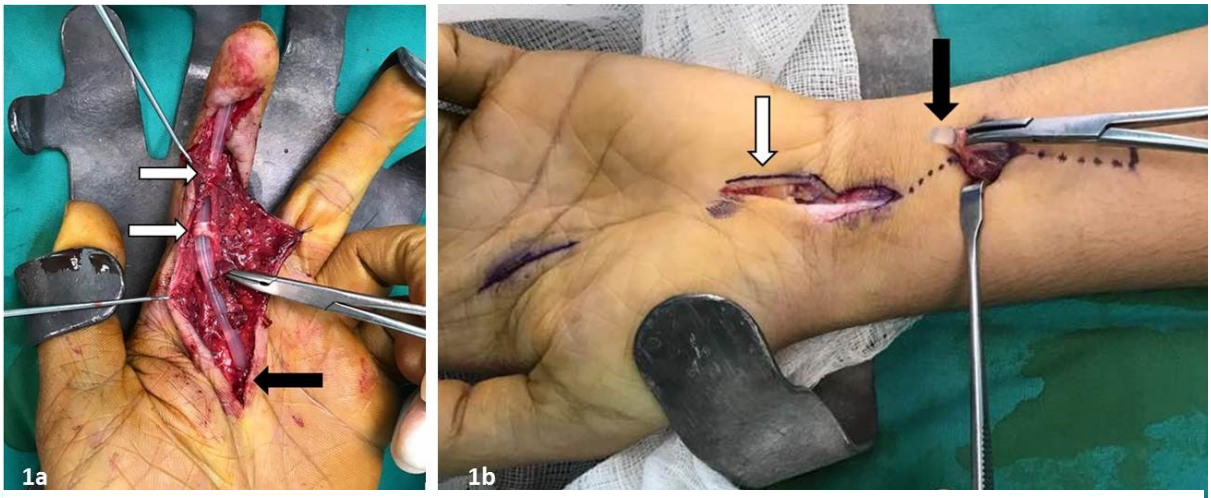

Figure 1: (a) The initial first stage procedure showing the silicone rod tunnelled underneath the reconstructed pulleys (white arrows) and proximally into mid-palmar (black arrow). Distal anchorage was to the stump of the profundus tendon. (b) Distal tip of the migrated silicone rod found within the subcutaneous layer of the forearm (black arrow). Note the unnecessary carpal tunnel release done to find the silicone rod (white arrow).

swan neck deformity. There was bowstringing of the flexor tendon as expected. He was able to flex 0 – 60 degrees at the MCPJ, 0 – 45 degrees at the PIPJ and 0 – 20 degrees at the DIPJ. He was able to perform his daily activities and work as a factory worker. At one year post-operation, the range of movement remains the same. He was satisfied with the outcome and only complained of pain when carrying items weighing more than 10 kilograms.

DISCUSSION

Staged flexor tendon reconstruction is commonly employed for a failed primary tendon repair (either due to re-rupture or adhesion) or chronic flexor tendon injury.[2] This technique has been described extensively in the literature with several modifications.[2,4,7-9] However, the basic principle remains the same, which consisted of the first stage implantation of the silicone rod to form a pseudosheath followed by a second stage reconstruction with a tendon graft.[1] This pseudosheath have a smooth surface that mimics a tendon sheath thus allowing for the tendon graft to glide smoothly, thus restoring function of affected digits.[8] The accepted time interval between the two stages is in between two to six months.[1,9] During this interval, passive motion of the operated digits is started as soon as possible and the aim is to get maximum flexion of the digits to touch the palm[1-2,9] Post-operative care following the second stage procedure varies between authors but generally a splint will be provided to prevent extension of the digit and active motion is started as early as three weeks with unrestricted motion and strengthening after six weeks.[1-2,9] Long-term outcome following this procedure has been reported to be satisfactory in 60 – 90% of patients.[2-4]

The usage of the rod even though advocated, does present with several complications such as rod buckling, silicone synovitis and, the focus here, rods migration.[2,4,5-9] Incidence of rod migration is reported with rate up to 5% and is caused by rupture of the distal attachment followed by milking of the rods proximally due to passive or in our case active movement of the digits.[6,8,10] The extent of migration was described to be just proximal to the distal interphalangeal joint, up to the palm and uncommonly, up to the forearm.[2,5,6,8] Rod migration usually leads to failure of pseudosheath formation, thus considered as failure of the first stage of the procedure and it may cause median nerve neuropathy if it coils in the carpal tunnel.[8,10] In our patient, the migration occurs within three months following

the implantation and it had migrated proximally up to the distal third of the forearm.

Our patient admitted to performing vigorous movement of his fingers by carrying heavy boxes which may have resulted in tearing of the attaching sutures from the silicone rod. Further subsequent movements of the hand and forearm may have milked the rod to migrate 21cm up into the forearm. The rod was not palpable under the skin, which is why a carpal tunnel release was carried out in the hope of finding the rod there. This is the first case of silicon rod migration encountered in our unit, having performed numerous cases of this 2-stage flexor tendon reconstruction previously. It is unlikely that the migration was attributed to poor distal fixation during the initial first stage procedure.

CONCLUSION

Silicone rod migration is a possible complication in staged flexor tendon reconstruction. Vigorous movement can cause the rod migration into the subcutaneous area of the forearm rather than just within the palm or carpal tunnel. We currently advise our patients against vigorous usage of the digits and to comply with the physiotherapist instructions of gentle passive exercise to maintain joint mobility.

DISCLOSURE STATEMENT

The authors reported no conflict of interest or financial liability.

INFORMED CONSENT

Consent has been obtained from the patient in regards to the pictures and details included in this report.

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