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RESEARCH ARTICLE

RELATIONSHIP BETWEEN DEVELOPMENT OF TRIGGER FINGER IN POST CARPAL TUNNEL RELEASE PATIENT WITH DIABETES MELLITUS

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ABSTRACT

Background: We present the study of development of trigger finger in post Carpal Tunnel Syndrome release patients with diabetes mellitus hypothroidism as risk factors.
Patient and Methods: 103 patients with Carpal Tunnel Syndrome in age group 45-55 with no trigger finger prior to surgery selected, underwent Carpal Tunnel Syndrome release and followed up for 3-5 months and developed triggering of the finger.
Results: All patients are selected with Carpal Tunnel Syndrome with no prior trigger finger underwent Carpal Tunnel Syndrome release by Mini Palm Carpal Tunnel release technique and most the patients developed have diabetes mellitus as the main risk factor.
Conclusion: Diabetes Mellitus is a major contributing factor in patients developing triggering of the finger in the post carpal tunnel syndrome release hand.

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INTRODUCTION

Carpal Tunnel Syndrome and Trigger finger are common ailments of the upper limb. Carpal Tunnel syndrome is the most common entrapment neuropathy of the upper limb. Trigger finger is associated with painful locking of the involved digits. Carpal Tunnel Syndrome and Trigger finger are important causes of occupational absteenism, disability and often coexist in the same hand. Here we conduct a study to assess the relationship between Trigger finger and Carpal Tunnel Syndrome ie patients developing trigger finger following Carpal Tunnel release(open CT release) within a period of 3-7 months of surgery. Etiology of both is unknown mostly idiopathic but there are certain risk factors like Diabetes mellitus, Hypothyroidism, osteoarthritis etc of which Diabetes mellitus and Hypothyroidism are taken in account for our studies. Carpal Tunnel syndrome is known as Tardy Median Nerve palsy occurs mostly in females (5:1) in most common age group (40-50) may affect on any age group. Usually symptoms are bilateral but generally occurs first and more severe in the dominant limb. Dominant limb is usually involved due to entrapment of the median nerve between the Transverse Carpal ligament and flexor tendon with symptoms over the lateral 3-5 fingers of the hand. Trigger finger is the inflammation of the synovial sheath that encloses the flexor tendon of thumb/fingers due to enlargement of tendon itself or narrowing of the first annular pulley (A1 pulley) mostly in females more than in males in the age group 40-50. When associated with collagen diseases more than one fingers are involved most of the time third and ring finger. Patient presenting with lump or knot in the palm which is thickened annular part of flexor sheath or nodule or fusiform swelling of the flexor tendon. Nodule which is just proximal to annulus of the metacarpophalangeal joint level. Usually patients state problem at proximal inter phalangeal joint.

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Pathophysiology of Trigger Finger: Trigger finger or stenosing tenosynovitis is due to pathologic disproportion between the volume of the retinacular sheath and its contents which inhibits gliding as the tendon moves through the A1 pulley.

Two types:

1. Nodular stenosing tenosynovitis
2. Diffuse stenosing tenosynovitis

Nodular stenosing tenosynovitis occur just distal to A1 pulley. In diffuse stenosing tenosynovitis inflammation will not be as localized and will extend beyond the A1 pulley. Considerable angulation of the flexor tendon occurs at the proximal edge of A1 pulley during forceful flexion of the digits. Normal A1 pulley has 2 layers -vascular outer layer and collagenous inner layer which is the gliding layer. In diseased A1 pulleys, the gliding layer hypertrophies.

PATIENT AND METHODS

We have conducted our study in a period of 14 months from September 2017 to October 2018. In our study we conduct a prospective study on 103 patients of which 87 are females and 16 males of the age group 45-55 years who were evaluated pre operatively to have Carpal Tunnel syndrome unilateral as well as bilateral. These patients were evaluated to rule out patients having trigger thumb before surgery and we have excluded those patients and study group underwent nerve conduction study and other routine investigations and were posted under Open Carpal Tunnel Release surgery that is Mini Palm Open Carpal Tunnel release of which 31 patients developed trigger finger in 3-7 months follow up of the surgeries of which 18 patients had diabetes mellitus. 11 patients developed trigger finger idiopathically and 2 of them are having hypothyroidism and on drugs. Out of the 31 patients who developed trigger finger following Carpal Tunnel release 26 patients were females and 5 males and 27 patients were preoperatively found to have mild to moderate Carpal Tunnel Syndrome symptoms and 4 have severe symptoms and patients who developed trigger finger were treated by open release of the A1 pulley for 26 patients who were willing for a second surgery and 5 patients were treated by corticosteroid injection (medicort 40mg) into the tendon sheath by lateral approach.

TREATMENT

Surgical Method

Mini Palm Open Carpal Tunnel Release

Done by marking the planned surgical incision with skin pen. Longitudinal incision begins distal to distal flexion crease slightly ulnar to midline of wrist and extend distally 3cm in line with third web space and transverse carpal ligament exposed and retract the palmar fascia fibres and hypothenar fat and transverse carpal ligament is divided and distal 2cm of anterior branchial fascia with metzenbaum scissors. The median nerve is adherent to divided radial transverse carpal ligament leaf, external neurolysis may be needed. Close the incision in routine fashion. Apply compressive force. Trigger finger release done by open release of the A1 pulley can be done through transverse or a longitudinal incision in the palm. We prefer to longitudinal one with local anesthesia because it allows active flexion and extension on the table and completeness of the release can be confirmed. Neurovascular bundle on either side identified and protected and skin closed. Triggering checked after tourniquet deflation. Percutaneous release not done due to incomplete release of the A1 pulley and potential chance of adjacent neurovascular injury, tendons themselves or volar plate. Some patients not willing for surgery technique second time are treated with steroid injection into the tendon sheath by lateral and palmar approach .The needle inserted into the mid lateral area of the proximal phalanx above a line connecting the proximal interphalangeal and distal interphalangeal joint creases. Lateral approach is less painful and easier.

Post op Care

Patients were admitted for one day with IV antibiotics and analgesics, discharged the next day and followed up on 7th post op day for wound inspection and sutures removed on 12th post op day and regularly followed up on 6 weeks for 6 months.

Table 1. Total number of patients with carpal tunnel syndrome

Total	Female	Male
103	87	16

Table 2. Patients developed trigger finger post carpal tunnel syndrome release

Total	Females	Males
31	26	5

Table 3. Patients who developed trigger finger following carpal tunnel syndrome release-31/103

Risk Factor	Diabetes Mellitus	Idiopathic	Hypothyroidism
Numbers	18	11	2
Percentage	58%	35%	7%

Table 4. Fingers on Which Trigger Developed

Triggering occurs on	No of Patients	Percentage
Thumb	7	22.5%
Index finger	3	9.6%
Middle finger	5	16.1%
Ring finger	15	48.3%
Little finger	1	3%

DISCUSSION

Etiology of Carpal Tunnel Syndrome is multi factorial. Trigger finger develops following carpal tunnel syndrome is common mostly associated with diabetes mellitus and then idiopathic causes of carpal tunnel syndrome and hypothyroidism. Trigger finger is observed in patients following carpal tunnel syndrome release in a mean period of 5 months. Surgery may change the environment inside and near carpal tunnel. Biomechanically flexor tendons at wrist are known to displace anteriorly after division of the transverse carpal ligament when this bowstringing occurs the angle of attachment of the flexor tendons against A1 pulley increases, which may cause a greater frictional and compressive force between flexor tendons and the A1 pulley. This increased force at the tendon-pulley interface may lead to trigger finger. Fibrocartilagenous metaplasia is known to develop at the site of increased compressive force on connective tissues, and has been reported at the friction surface of the A1 pulley taken from a patient with trigger digit. Surgery may accelerate the development of trigger finger when carpal tunnel syndrome is mild to moderate but in severe carpal tunnel syndrome some factors like hypertrophy of the flexor tenosynovium mask the effect of surgery. In our observation, carpal tunnel syndrome release is a possible pathology for developing trigger finger that had not been present prior to surgery.

EVALUATION AND RESULTS

In our study we found that trigger finger after open carpal tunnel syndrome release ie method we use is Mini Palm Open Carpal Tunnel release which was conducted in our hospital as elective procedure after all investigations and found that 30.1% (31/103) of the patients developed trigger finger following carpal tunnel syndrome release in a period of 3-5 months post surgery of which 58%(18) of the people having diabetes mellitus and 7%(2) have hypothyroidism and rest 35%(11) develop trigger finger idiopathically. Ring finger is the one mostly affected(48.3%) and followed by thumb (22.5%) and then middle finger(16%), index finger (9.6%) and little finger

(3%) least affected. Of these people we released the trigger finger by open release of the A1 pulley through longitudinal incision in the palm for 26 patients and steroid injection into the tendon sheath done by lateral approach for 5 patients and cured them.

Conflict of Interest: The author(s) declare they have no competing interests.

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