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Chronic Intra-tendinous Tophaceous Gout in Repaired Flexor Digitorum Superficialis Tendons of the Right Index and Middle Finger: A Case Report

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Abstract

Monosodium urate (MSU) crystal deposition in tendons is well documented in patients with gout. However, only a handful of cases have reported tophaceous gout infiltration into surgically repaired tendons, with only one reported in the flexor digitorum tendons.

This case reports a 38-year-old male with a long-standing history of gout presenting with gouty tophi deposition in proximity to nonabsorbable sutures used for previously repaired flexor digitorum superficialis (FDS) tendons of the index finger (IF) and middle finger (MF). During debulking, the MF FDS tendon ruptured. Due to the loss of tendon structure, the FDS of the IF and MF were excised and reconstructed by pairing with their respective FDP tendons. To our knowledge, this is the first reported case of gouty tophi infiltration of repaired FDS tendons. In conclusion, this case emphasises the importance of anticipating rupture when debulking around repaired tendons and planning for reconstruction in advance. Furthermore, the factors contributing to MSU deposition in repaired tendons remain speculative and warrant further investigation to determine their aetiology.

Categories: Plastic Surgery, Rheumatology, Orthopedics
Keywords: flexor digitorum superficialis, flexor tendon rupture, repaired tendon, tendon reconstruction, tophaceous gout

Introduction

Gout is a form of inflammatory arthritis that is commonly caused by excess uric acid levels in the body, resulting in the formation of monosodium urate (MSU) crystals. These crystals deposit within periarticular structures and joints, especially at the first metatarsophalangeal joint, the knee, and midfoot [1]. Tophaceous gout is a chronic manifestation of uncontrolled MSU crystal deposition that occurs in patients with longstanding hyperuricaemia. Tophi are palpable nodules consisting of a white, chalky substance that appears within subcutaneous tissues [2]. Beyond bone, ligaments, synovium, and cartilage, tendons are a well-documented site of tophaceous infiltration. According to Towiwat et al., gouty tophi have a predilection for avascular or poorly vascularised tissues like tendons [3].

However, gouty tophi formation around a retained foreign body is infrequently documented, with only seven cases documented to our knowledge: five after an Achilles tendon repair [4-7], one after an extensor tendon repair [8], and one after a flexor digitorum profundus (FDP) repair [9]. Hence, the incidence of tophi in repaired flexor tendons is even rarer. In this article, we report a rare case of intra-tendinous tophaceous gout in repaired flexor digitorum superficialis (FDS) tendons of the index finger (IF) and middle finger (MF), where we surgically excised the FDS of the IF and MF and reconstructed the defect by buddying the distal and proximal stumps of IF and MF FDS to their respective FDP. Tophi over the IF, MF, and ring finger (RF) of the FDP, first palmar interossei, and adductor pollicis were debulked.

Case Presentation

A 38-year-old right-hand-dominant male with a 22-year history of chronic, widespread tophaceous gout was referred to the hand team for intermittent numbness and purpuric discolouration upon flexion of the right wrist and demonstrated a significant range of movement deficit of the right wrist. His surgical history was significant for repair of IF, MF, and RF FDS, microsurgical repair of common digital nerves to IF, MF, and RF, and microsurgical repair of common digital artery to IF and MF (2014). The patient underwent gouty tophi debulking over the right wrist and carpal tunnel release in 2015, and one bariatric gastric sleeve surgery with additional revision of gastric sleeve surgery. His medical history was significant for chronic tophaceous gout. The patient is on allopurinol 400 mg and probenecid 500 mg BD. A trial of febuxostat was given before, but the patient did not tolerate it.

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Physical examination showed multiple tophaceous gout sites (left hand, right hand, and left heel of the foot). The focus of this case is on the patient's right wrist, where there are extensive gouty tophi over the right carpal tunnel, with 8 cm × 3 cm tophi over the mid-palmar space extending to the wrist crease. There was an excision scar over the right elbow and right palm, which was revealed to be previous gouty tophi excision sites. When assessing wrist movement, right wrist volar and dorsiflexion are limited to 15 degrees. There was thenar atrophy with abductor pollicis brevis weakness. When assessing finger function preoperatively, the patient had full range of motion and normal sensation of his digits. The patient was subsequently referred for right-hand tophi debulking (Figure *1*).

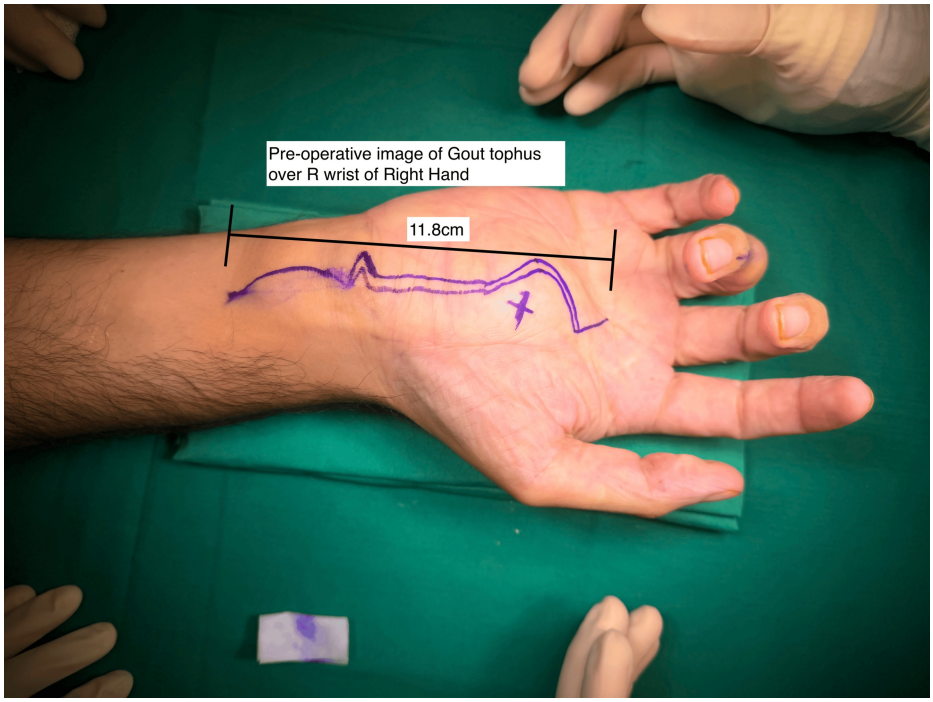


FIGURE 1: The blue marking in this figure shows the extent of the right wrist gouty tophi, extending up to 11.8 cm.

Preoperative workups such as magnetic resonance imaging (MRI) reported heterogeneous enhancing conglomerate masses centred within the carpal tunnel and extending distally volar to the proximal metacarpals, measuring 5.7 cm × 4.4 cm × 11.8 cm in total extent, which is compatible with known tophaceous gouty deposits (Figure *2*). The mass effect caused displacement of the ulnar nerve and compression of the median nerve. His serum urate level was 9.3 mg/dL during a previous admission two months ago, and his infection markers before this surgery, such as WBCs, were 7.7 × 10^9/L; CRP was 0.6 mg/L; and temperature was 36.5°C.

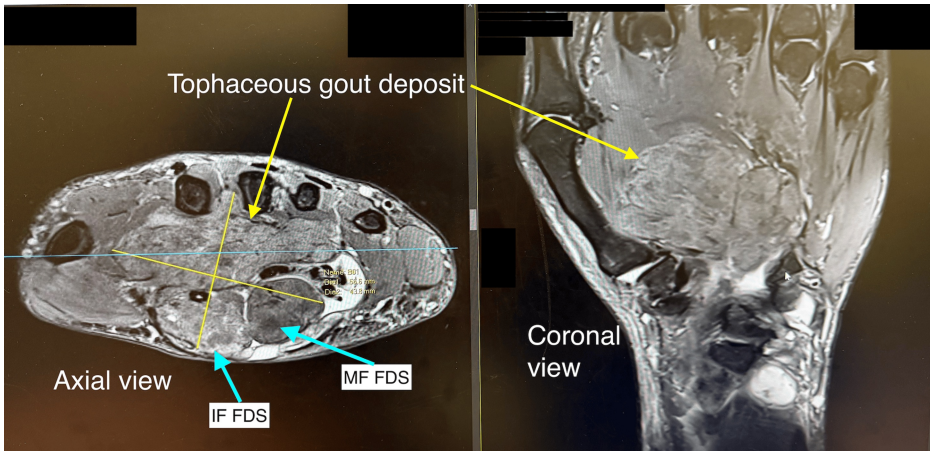


FIGURE 2: MRI of the right wrist in axial and coronal views.

MRI image on the left: This shows an axial view of a heterogeneous enhancing conglomerate mass compatible with known tophaceous gouty deposits, measuring 5.7 cm × 4.4 cm, as indicated by the yellow perpendicular lines within the carpal tunnel.

MRI image on the right: This shows a coronal view of a heterogeneous enhancing conglomerate mass compatible with known tophaceous gouty deposits centred within the carpal tunnel, which extends 11.8 cm distally to the proximal metacarpals.

The yellow arrows indicate the gouty deposits. The blue arrows indicate the middle finger and index finger of the flexor digitorum superficialis. Within the index finger FDS, we can see a low-signal-intensity mass indicating a presumed gouty tophus deposit.

FDS: flexor digitorum superficialis; MRI: magnetic resonance imaging

At the actual surgical site, extensive white, chalky, and pasty granular material was seen in the right IF and MF FDS and FDP within zones III-IV, RF FDP, first palmar interossei, adductor pollicis, and extensor digitorum of the RF within zone III (Figure *3*). The previously repaired RF FDS was unaffected by gouty tophi and left untouched. Tenolysis was carefully performed to visualise the IF, MF, and RF FDS and FDP before debulking. Non-absorbable suture material was seen at the proximal and distal parts of the two previously repaired FDS tendons. There was no distinct plane between the tophi and the repaired FDS tendons. No tissue was sent for histology, polarised light microscopy, or culture. Given the patient's long-standing history of tophaceous gout, imaging, and clinical features, the findings were considered consistent with tophaceous gout infiltration.

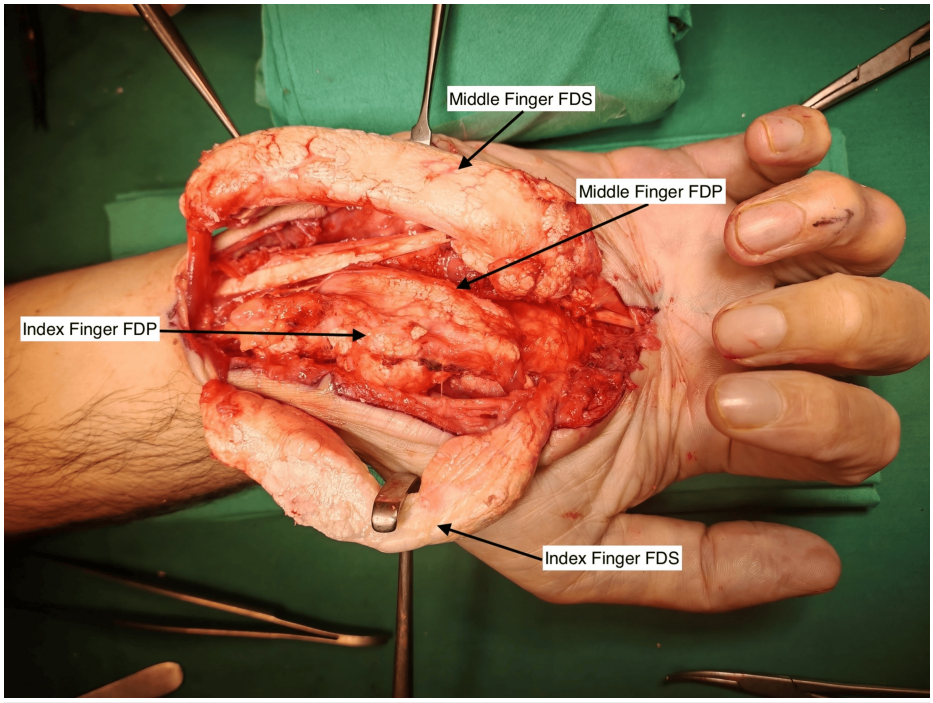


FIGURE 3: Pre-debulking photograph showing presumed gouty tophi surrounding the middle and index finger FDP and FDS.

FDS: flexor digitorum superficialis; FDP: flexor digitorum profundus

During careful removal of tophi from the MF FDS, the repaired tendon ruptured. The ruptured tendon revealed previous suture material infiltrated by presumed gouty tophi. The structure of the tendon could not be preserved; hence, the repaired MF FDS tendon was excised. The IF FDS presented with the same features; a decision was made to excise the IF FDS. Tophi over the IF, MF, and RF of the FDP, first palmar interossei, and adductor pollicis were debulked to unload the gouty tophi deposits and to decompress and protect neurovascular structures (Figure *4*). The tophi surrounding the RF extensor tendon were debulked minimally to preserve the lateral band and central slip.

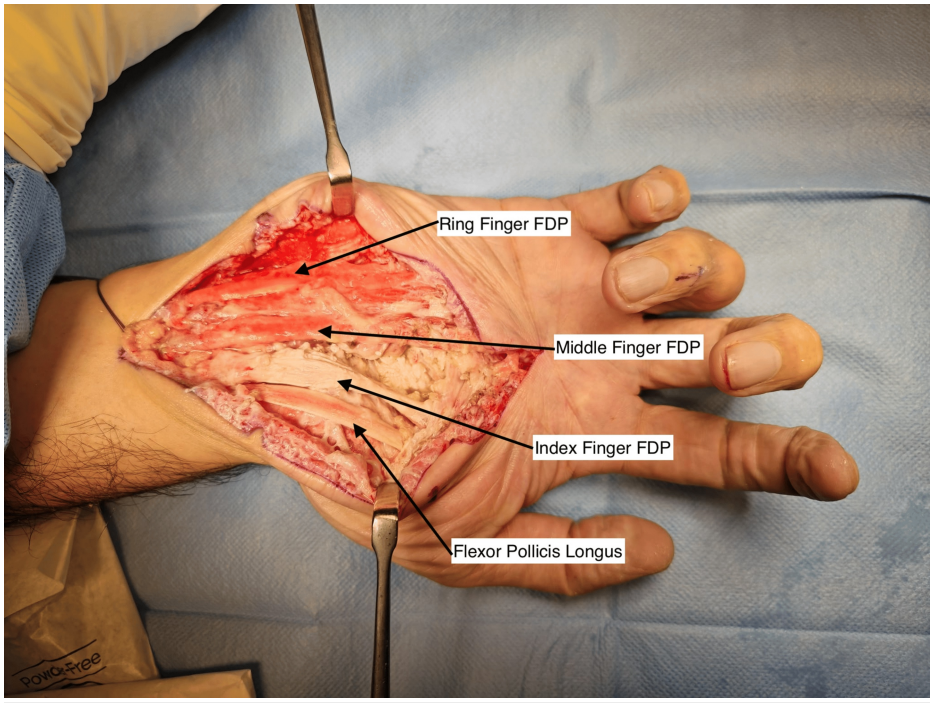


FIGURE 4: Post-debulking photograph showing the debulked middle and index finger FDP.

FDP: flexor digitorum profundus

Following debulking and washout, the defects required reconstruction. The excised distal stumps of the IF and MF FDS tendons were stitched to the IF and MF FDP tendons, respectively, using a figure-of-eight technique. The proximal stumps of the IF and MF FDS were also stitched in a figure-of-eight pattern to the FDP tendons to allow for possible tendon graft reconstruction if the patient was keen in the future. Ethicon PDS Plus 4-0 suture, a monofilament absorbable suture, was used.

The buddy repair did not impair his baseline hand function, such as grip and power strength, as his FDP tendons were still intact; hence, after the operation, the patient was allowed to perform active range of motion immediately to prevent scar formation. When examining the patient one week after the operation, the patient did not complain of any pain or altered sensation or show signs of infection, and no splint was necessary (Figure *5*). Two weeks postoperatively, when tendon healing was better, passive range of motion was initiated to prevent rupture at the repair site. One month after the operation, the patient was discharged from Hand Surgery with no complications. He had preserved range of motion of the fingers, satisfactory grip strength, and no symptoms of median or ulnar nerve compression. Subsequently, he was allowed to resume weight-bearing through the hand.

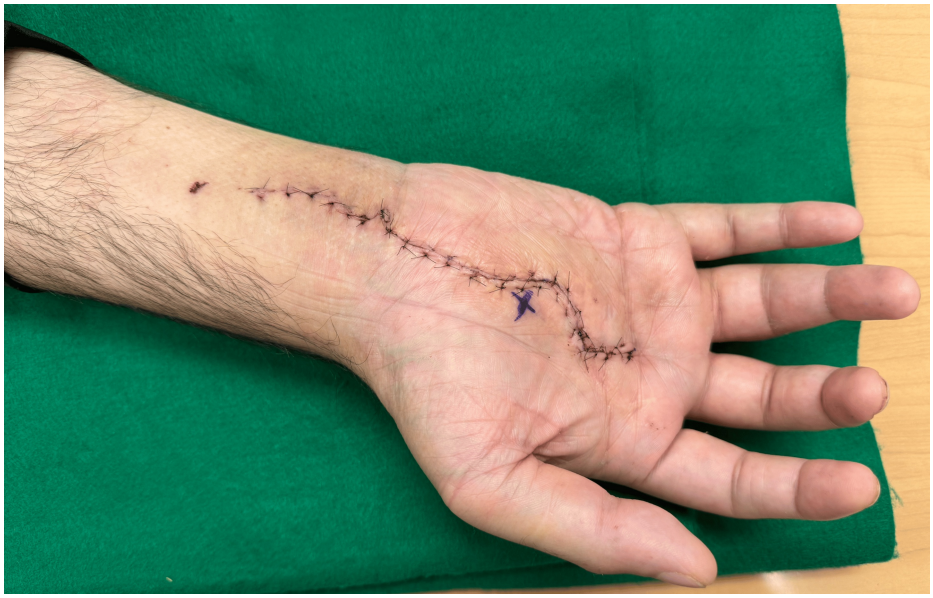


FIGURE 5: One-week post-debulking photograph.

Discussion

This case report highlights a rare presentation of intra-tendinous tophaceous gout infiltrating multiple previously repaired FDS tendons in proximity to retained non-absorbable suture material. While tendon infiltration by gouty tophi is an established manifestation of advanced gout, tophi formation tracking along surgical repair sites in the hand is a unique finding. A search of the literature between 2000 and 2026 with the keywords 'gout' and 'repaired tendon' found seven similar cases of gout infiltration into repaired tendons. We have compiled them in Table *1* for better comparison. To our knowledge, this is the first reported case of gouty tophi infiltration into repaired FDS tendons. The closest case reported was by Sainsbury et al. in 2008, where they reported intra-tendinous gout in a repaired FDP [9].

	Brandon et al. [4]	Giani and Gutteling [5]	Dhodapkar et al. [6]	Lin et al. [7]		Heo et al. [8]	Sainsbury et al. [9]	My case report
Age (years)	53	58	32	42	35	26	28	38
Sex	Male	Female	Male	Male	Male	Male	Male	Male
Tendon	Achilles tendon	Achilles tendon	Achilles tendon	Achilles tendon	Achilles tendon	Second extensor digitorum communis and extensor indicis proprius tendons.	Zone IIc flexor digitorum profundus	Second and third flexor digitorum superficialis
Interval since repair (years)	2.5	12.5	7	6	8	11	7	12
Suture type	FiberWire non-absorbable sutures	FiberWire non-absorbable sutures	FiberWire non-absorbable sutures	FiberWire non-absorbable sutures	FiberWire non-absorbable sutures	Unknown brand non-absorbable suture	Supramid brand non-absorbable	Unknown brand non-absorbable suture

TABLE 1: Comparison between previously reported cases which identified intra-tendinous gout in repaired tendon.

Source: [4-9]

It is well established that gouty tophi have a predilection for avascular or poorly vascularised tissues like tendons, ligaments, and cartilage [3]. According to Chhana et al., factors such as lower temperatures and limited blood supply, as mentioned before, and repeated mechanical irritation can increase the likelihood of MSU crystal deposition [10].

Several explanations are possible for tophi involving these repaired tendons. The simplest is extensive, long-standing tophaceous disease with persistent hyperuricaemia, in which the deposits have spread through many tissues of the hand. In this patient, unrepaired structures, including FDP tendons, first palmar interosseous, adductor pollicis, and RF extensor, were also involved, so the repaired tendons may simply have been caught up in diffuse disease. This theory can be supported by the fact that the previously repaired RF FDS tendon was spared from gouty tophi infiltration. On the other hand, scarred, poorly vascularised tendon and retained suture may increase the likelihood of MSU crystal deposition, and suture material may act as a physical nidus, as suggested in an earlier report [7].

A practical lesson from this case is that debulking tophi around previously repaired tendons may lead to tendon rupture. Here, the repaired MF FDS ruptured during debulking and could not be salvaged. This possibility should be considered and discussed with the patient beforehand, and a plan for tendon reconstruction should be made in advance. A subpar reconstruction strategy would result in reduced power of proximal interphalangeal (PIP) joint flexion and the ability to flex a finger independently, although the intact FDP can still flex the PIP joint [11]. In our patient, the distal and proximal stumps of the IF and MF FDS were stitched to their respective FDP tendons with a figure of ‘8’ suture. At one month, he had preserved finger movement and satisfactory grip strength.

Beyond the surgical findings, this case highlights the importance of urate control in conjunction with surgery. At presentation, the patient was prescribed allopurinol 400 mg daily and probenecid 500 mg twice daily; febuxostat had previously been trialled but not tolerated. His serum urate, measured during admission, was 9.3 mg/dL (553 µmol/L). This was well above the target of <6 mg/dL (360 µmol/L) recommended by EULAR (European League Against Rheumatism) and ACR (American College of Rheumatology), and above the lower target of <5 mg/dL (300 µmol/L) that EULAR advises in severe tophaceous disease [12,13]. This single measurement was taken during a previous admission two months ago. His adherence and his previous serum urate levels are unknown, so it cannot show how long his gout has been uncontrolled. He also acknowledged non-attendance for gout follow-up. After surgery, we referred him to rheumatology to optimise his urate-lowering therapy. Debulking will not treat the cause; consistent urate-lowering therapy is required to limit recurrence.

Limitations

One limitation to this case report was the lack of information regarding the patient’s initial FDS repair. The repair was carried out before the digitalisation of the healthcare system, so we could only find out how long ago the surgery was, but not the surgery report that documents what type of suture was used. Furthermore, since the patient was followed up by an outside healthcare provider in another region, his previous serum urate levels, adherence, and whether rheumatology input was sought are unknown.

The diagnosis of tophaceous infiltration of the repaired tendons was made on clinical, radiological, and intraoperative grounds in the context of long-standing, widespread tophaceous gout. No tissue was sent for histology, polarised light microscopy, or culture, so the diagnosis remains presumptive. Alternative explanations include a foreign body reaction, like granuloma formation [14], or low-grade infection; therefore, these cannot be formally excluded. It was important to recognise that the foreign body reactions did not occur in hand flexors. Against infection, the patient was clinically well, MRI showed no features of infection, and inflammatory markers like WBC (7.7×10^9/L), CRP (0.6 mg/L), and temperature (36.5°C) were within the normal range before surgery. Histological confirmation would have strengthened the aetiological interpretation, and we recommend that tissue be sent for similar cases in the future.

Conclusions

Tophaceous gout can infiltrate multiple previously repaired flexor tendons, as demonstrated in this case report. To our knowledge, this is the first reported case of gouty tophi infiltration into repaired FDS tendons. The factors contributing to MSU crystal deposition in repaired tendons are still unestablished and speculative. Furthermore, this case highlights that we should anticipate rupture when debulking around repaired tendons, plan in advance for reconstruction, send tissue for histology and culture, and involve rheumatology.

This case underscores the need for more research into the aetiology of MSU crystal deposition in repaired tendons. Finally, although surgical debulking and flexor tendon reconstruction can provide resolution of symptoms, long-term systemic urate control remains essential to possibly reduce the recurrence of gouty tophi infiltration.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Qi Sen Gan, Fang Li

Acquisition, analysis, or interpretation of data: Qi Sen Gan

Drafting of the manuscript: Qi Sen Gan

Critical review of the manuscript for important intellectual content: Qi Sen Gan, Fang Li

Supervision: Fang Li

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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