Surgery Article

HAND
2021, Vol. 16(4) 542–545

DOI: 10.1177/1558944719867135
journals.sagepub.com/home/HAN

Epidemiology of Trigger Finger: Metabolic Syndrome as a New Perspective of Associated Disease

Junot H. S. N.[1], Anderson Hertz A. F. L.[1], Gustavo Vasconcelos G. R.[1], Debora C. Esquerdo C. da Silveira[1], Paulo Nelson B.[1], and Saulo F. Almeida[1,2]

Abstract

Objective: The aim of this study was to identify the main diseases related to trigger finger. **Methods:** A retrospective, observational study was performed with data obtained through a computerized record of 75 patients with trigger finger diagnosis between July 2011 and October 2015. The diagnosis of metabolic syndrome was performed following National Cholesterol Education Program Adult Treatment Panel III (2001). **Results:** Patients' ages ranged from 50 to 84 years, with a mean age of 63 years. The ring finger was the most affected, followed by the middle finger, index finger, and little finger. Most had a grade 2 trigger finger classified by Green; the right hand involvement was more prevalent, as was the dominant hand. The incidence in women was twice as high as in men. Arterial hypertension, diabetes mellitus, and dyslipidemia were shown to be important associated diseases, but metabolic syndrome was the main association found. **Conclusions:** Metabolic syndrome in the group of patients studied in this scientific article seems to be the main associated disease.

Keywords: trigger finger, metabolic syndrome, tendinopathy

Introduction

Trigger finger is a prevalent disease and is often diagnosed and treated by hand surgeons around the world. It has a prevalence of greater than 3% in the general population[1]; however, this estimate increases 5% to 20% in the population with a diagnosis of diabetes mellitus, although its true cause is still unknown.[2,3] It was described for the first time by Notta,[4] receiving this name due to the painful clicking associated with flexion and extension of the fingers affected mainly in the topography of the first annular pulley (A1), which is the most common place because it is subject to higher loads than the other pulleys.[5]

Local corticosteroid injection is a treatment option that can improve symptoms in more than 90% of the affected fingers in nondiabetic patients[6-8]; however, in patients with type 2 diabetes mellitus, the success rate drops to approximately 66%,[9,10] whereas patients with a diagnosis of metabolic syndrome reduce their chances of success to 50%.[11]

Metabolic syndrome is a constellation of interrelated risk factors of metabolic origin. In 2001, the National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III) introduced clinical criteria for the definition of the metabolic syndrome. Diagnostic criteria are divided into abdominal obesity, elevated triglycerides, reduced high-density lipoprotein (HDL) cholesterol, high blood pressure, and elevated fasting glycemia. The presence of 3 of the 5 factors makes the diagnosis of metabolic syndrome, which is responsible for a chronic systemic inflammatory process.[12]

Materials and Methods

A retrospective study was performed with the electronic medical records of 75 patients with the diagnosis of trigger finger between July 2014 and October 2015. The diagnosis

[1]Hospital Naval Marcílio Dias, Rio de Janeiro, Brazil
[2]Instituto Nacional de Traumatologia e Ortopedia, Rio de Janeiro, Brazil

Corresponding Author:
Junot H. S. Neto, Department of Orthopedics and Traumatology, Hospital Naval Marcílio Dias, Rua Cesar Zama, 185 – Lins de Vasconcelos, Rio de Janeiro 20725-090, Brazil.
Email: netojunotf@gmail.com

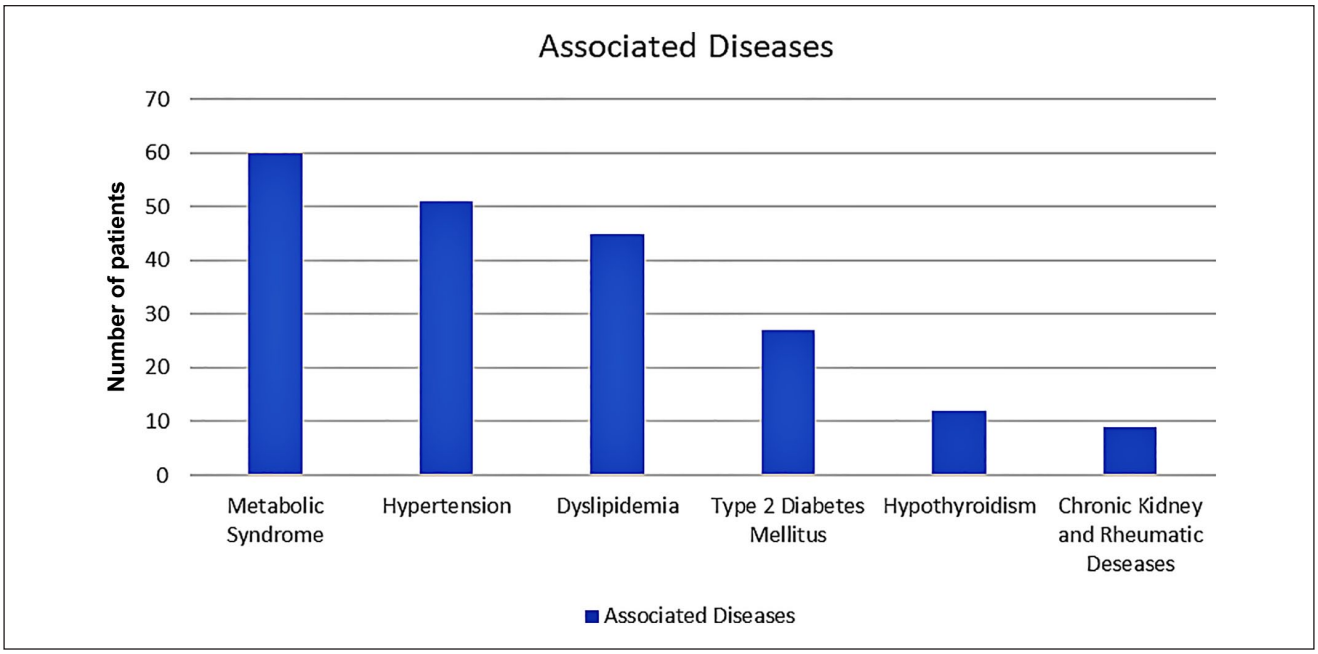

Figure 1. Prevalence of systemic diseases associated with the trigger finger.

of metabolic syndrome was conducted according to the parameters of the NCEP ATP III (2001). The confidence level was 95%, with a margin of error estimated at 0.05. The study did not only cover patients with a previous diagnosis of metabolic syndrome but also evaluated all patients diagnosed with trigger finger in the selected period. The diagnosis of the trigger finger was performed by physical examination through painful palpation on the A1 pulley and painful clicking associated with flexion and extension of the fingers affected. All the patients had laboratory tests to evaluate the HDL cholesterol, triglycerides, and glucose recorded in the medical record, in addition to abdominal circumference and blood pressure.

Results

Patients' age ranged from 50 to 84 years, with a mean age of 63 years. The ring finger was the most affected (29 patients), followed by the middle finger (25), thumb (18), index finger (2), and little finger (1).

Considering laterality, the right hand was affected in 60% of the cases, the left hand in 35%, and bilateral in 5%. Predominance by the dominant hand was observed in 70% of the patients. Women corresponded to 51 (68%) of the cases, whereas men corresponded to 24 (32%), representing a ratio of 2:1 between women and men.

In this sample, 80% of patients had diagnostic criteria for metabolic syndrome (confidence interval: 75%-85%), 68% had systemic arterial hypertension (confidence interval: 63%-73%), 60% had dyslipidemia (confidence interval: 55%-65%), 36% had type 2 diabetes mellitus (confidence interval: 31%-41%), 16% had hypothyroidism (confidence interval: 11%-21%), and 12% had other pathologies such as renal insufficiency, chronic kidney disease, or rheumatic diseases (confidence interval: 7%-17%) (Figure 1).

Discussion

Metabolic syndrome affects 48.3% of the people aged between 55 and 64 years in Brazil.[13] The present study found 80% of patients with metabolic syndrome and trigger finger with a mean age of 63 years, which is much higher than the national average. These data may demonstrate a high prevalence of metabolic syndrome within our cohort of patients diagnosed with trigger finger in relation to the general population, and despite the expressive result, it is not possible to affirm that it has a causal relation between the 2 diseases, although it deserves special attention from the scientific literature. Moreover, according to Rho et al,[11] 50% of patients with metabolic syndrome did not respond to local corticosteroid injection treatment, and in the authors' opinion, this would be enough to prove the need for further research on the association between the metabolic syndrome and trigger finger.

Ample evidence shows that metabolic disorders, such as metabolic syndrome, have deleterious effects on tendons and favor tendon degeneration. Although the literature does not confirm a cause-and-effect relationship between the trigger finger and the metabolic syndrome or other metabolic diseases, Abate et al[14] state that in individuals referred

for orthopedic observation for tendinopathies or tendinous ruptures, the possibility of undiagnosed hypercholesterolemia, diabetes mellitus, glucose intolerance, and other metabolic diseases should be considered, as the treatment of dysmetabolic risk factors should also be an additional strategy to treat tendinous disorders.

With aging, the loss of tendon and ligament elasticity is associated with decreased synovial viscosity, increasing the coefficient of friction in the osteofibrous tunnel.[15] According to Harman,[16] these degenerative processes occur due to oxidative stress by accumulation of free radicals during aging, which is also considered one of the first manifestations of the metabolic syndrome.[17] These data found in the literature neither confirm the reasons for the higher prevalence of trigger finger in elderly patients nor define the etiology concretely; however, it makes the possibility of a higher prevalence of trigger finger in elderly patients with metabolic syndrome plausible and consistent with what was found in this study.

Another relevant finding is that the prevalence of trigger finger in our cohort was only twice as high in women as in men. Patel and Bassini[18] showed an incidence 6 times higher in women, which is much greater than what we found. It is noteworthy that all men present in our study were active, reserve, or retired military personnel, whereas all women were not. Of the 75 patients, 51 were women and 24 were men. Only 4 men performed administrative functions. The military personnel, throughout their career, perform tasks that require manual activities with above-average intensity, compared with most of the civilian population, and it is known that repetitive stress in a tendon promotes degenerative tissue changes that invariably evolve to irreversible tissue injury.[19] An example is that in animal models it was possible to find inflammatory infiltrate, tendon thickening, and hypervascularization when exposed to chronic loads.[20-22] In the authors' opinion, the increase in male incidence found in this cohort may be related to the type of activity performed in the military, and thus, we believe this finding corroborates with the literature when it states that repetitive movements and local trauma are possible associations with the trigger finger.[23-25]

Conclusions

Metabolic syndrome in the group of patients studied in this scientific article seems to be the main associated disease.

Ethical Approval

This study was approved by our institutional review board.

Statement of Human and Animal Rights

All procedures followed were in accordance with the ethical standards of the committee responsible for (institutional and national) human experimentation and with the Helsinki Declaration of 1975, revised in 2008.

Statement of Informed Consent

No consent was required. The medical ethics committee did not request the use of statement of informed consent because it is a retrospective study with analysis of medical records without personal information or experiments.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Junot H. S. Neto https://orcid.org/0000-0001-9258-0708

References

1. Baumgarten KM, Gerlach D, Boyer MI. Corticosteroid injection in diabetic patients with trigger finger. A prospective, randomized, controlled double-blinded study. *J Bone Joint Surg Am*. 2007;89:2604-2611.
2. Abate M, Schiavone C, Salini V, et al. Management of limited joint mobility in diabetic patients. *Diabetes Metab Syndr Obes*. 2013;6:197-207. doi:10.2147/DMSO.S33943.
3. Vance MC, Tucker JJ, Harness NG. The association of hemoglobin A1c with the prevalence of stenosing flexor tenosynovitis. *J Hand Surg Am*. 2012;37(9):1765-1769. doi:10.1016/j.jhsa.2012.06.007.
4. Notta A. Recherches sur une affection particuliere des gaines tendineuses de la main. *Arch Gen Med*. 1850;24:142.
5. Akhtar S, Bradley MJ, Quinton DN, et al. Management and referral for trigger finger/thumb. *BMJ*. 2005;331(7507):30-33. doi:10.1136/bmj.331.7507.30.
6. Freiberg A, Mulholland RS, Levine R. Nonoperative treatment of trigger fingers and thumbs. *J Hand Surg Am*. 1989;14(3):553-558.
7. Moore JS. Flexor tendon entrapment of the digits (trigger finger and trigger thumb). *J Occup Environ Med*. 2000;42(5):526-545.
8. Ring D, Lozano-Calderon S, Shin R, et al. A prospective randomized controlled trial of injection of dexamethasone versus triamcinolone for idiopathic trigger finger. *J Hand Surg Am*. 2008;33(4):516-522; discussion 523-524. doi:10.1016/j.jhsa.2008.01.001.
9. Griggs SM, Weiss AP, Lane LB, et al. Treatment of trigger finger in patients with diabetes mellitus. *J Hand Surg Am*. 1995;20(5):787-789. doi:10.1016/S0363-5023(05)80432-0.
10. Sibbitt WL Jr, Eaton RP. Corticosteroid responsive tenosynovitis is a common pathway for limited joint mobility in the diabetic hand. *J Rheumatol*. 1997;24(5):931-936.

11. Roh YH, Lee BK, Kim JK, et al. Effect of metabolic syndrome on the outcome of corticosteroid injection for trigger finger: matched case-control study. *J Hand Surg Am*. 2016;41(10):e331-e335. doi:10.1016/j.jhsa.2016.07.091.
12. National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) final report. *Circulation*. 2002;106(25):3143-3421.
13. Daniele Q. Fucciolo Penalva. Síndrome metabólica: diagnóstico e tratamento. *RevMed (São Paulo)*. 2008;87:245-250.
14. Abate M, Silbernagel KG, Siljeholm C, et al. Pathogenesis of tendinopathies: inflammation or degeneration? *Arthritis Res Ther*. 2009;11:235.
15. Fechine BRA, Trompieri N. Processo de Envelhecimento: As principais alterações que acontecem com o idoso com o passar dos anos. *Rev Cient Int*. 2012;1:106-132.
16. Harman D. Free radical theory of aging: an update: increasing the functional life span. *Ann N Y Acad Sci*. 2006;1067:10-21. doi:10.1196/annals.1354.003.
17. Ford ES, Mokdad AH, Giles WH, et al. The metabolic syndrome and antioxidant concentrations: findings from the Third National Health and Nutrition Examination Survey. *Diabetes*. 2003;52:2346-2352.
18. Patel MR, Bassini L. Trigger fingers and thumb: when to splint, inject, or operate. *J Hand Surg Am*. 1992;17(1):110-113.
19. Jarvinen M, Jozsa L, Kannus P, et al. Histopathological findings in chronic tendon disorders. *Scand J Med Sci Sports*. 1997;7(2):86-95.
20. Backman CL, Boquist L, Friden J, et al. Chronic achilles paratenonitis with tendinosis: an experimental model in the rabbit. *J Orthop Res*. 1990;8(4):541-547. doi:10.1002/jor.1100080410.
21. Backman CL, Friden J, Widmark A. Blood flow in chronic Achilles tendinosis. Radioactive microsphere study in rabbits. *Acta Orthop Scand*. 1991;62(4):386-387.
22. Messner K, Wei Y, Andersson B, et al. Rat model of Achilles tendon disorder. A pilot study. *Cells Tissues Organs*. 1999;165:30-39.
23. Ametewee K. Trigger thumb in adults after hyperextension injury. *Hand*. 1983;15(1):103-105.
24. Bonnici AV, Spencer JD. A survey of "trigger finger" in adults. *J Hand Surg Br*. 1988;13(2):202-203.
25. Verdon ME. Overuse syndromes of the hand and wrist. *Prim Care*. 1996;23:305-319.