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ORIGINAL ARTICLE

HOW DO BOARD-CERTIFIED HAND SURGEONS MANAGE CARPAL TUNNEL SYNDROME? A NATIONAL SURVEY

COMO O CIRURGIÃO ESPECIALISTA EM MÃO ABORDA A SÍNDROME DO TÚNEL DO CARPO? UM LEVANTAMENTO NACIONAL

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ABSTRACT

Objective: To evaluate tendencies in the planning, diagnosis, and treatment of carpal tunnel syndrome (CTS) by Brazilian hand surgery specialists. Methods: This cross-sectional study was performed at the 36th Brazilian Hand Surgery Congress. We prepared a questionnaire about preferences in the management of CTS, and board-certified hand surgeons that attended the congress were asked to fill out the questionnaires. A total of 174 questionnaires were analyzed. Results: Electromyography examination is used by most surgeons. Night splinting is the most commonly used conservative treatment option. Half of the surgeons utilized prophylactic antibiotics. Most of the interviewees conduct inpatient surgery in the operating room and prefer intravenous regional anesthesia. Most of surgeons use the standard open technique associated with proximal release of the antebrachial fascia and do not perform neurolysis. Compressive dressings are most commonly used for 7 days. Conclusion: The approach to CTS among Brazilian hand surgeons with regard to pre-, intra-, and post-operatory conduct is consistent with the international literature. However, there is a need to reflect and conduct new studies on non-surgical treatment involving local corticosteroid injection, use of prophylactic antibiotics, hospital admission, and type of anesthesia in order to provide more cost-effective approach to surgical treatment for CTS. ***Level of Evidence V; Expert opinion.***

Keywords: Carpal tunnel syndrome. Epidemiology. Therapy. Questionnaire. Cross-sectional studies.

RESUMO

Objetivo: Avaliar as tendências no planejamento, diagnóstico e tratamento da síndrome do túnel do carpo (STC) dos cirurgiões brasileiros especialistas em mão. Métodos: Este estudo transversal foi realizado no 36º Congresso Brasileiro de Cirurgia da Mão. Preparamos um questionário sobre as preferências no tratamento de STC, e os cirurgiões especialistas em mão que participaram do congresso foram solicitados a responder os questionários. Foram analisados 174 questionários. Resultados: A eletroneuromiografia é usada pela maioria dos cirurgiões. A tala noturna é a modalidade de tratamento conservador mais usada. Metade dos cirurgiões utiliza antibióticos profiláticos de rotina. A maioria dos entrevistados realiza as cirurgias no centro cirúrgico com internação hospitalar e prefere anestesia regional intravenosa. A maior parte dos cirurgiões emprega a técnica aberta padrão associada à abertura da fáscia antebraquial e não realiza neurólise. Curativos compressivos são habitualmente usados por sete dias. Conclusão: A conduta pré, intra e pós-operatória na STC entre os cirurgiões de mão brasileiros é compatível com a literatura internacional. Entretanto, há necessidade de reflexão e de novos estudos sobre a infiltração local de corticoides, o uso de antibióticos profiláticos, internação hospitalar e tipo de anestesia com o objetivo de proporcionar melhor custo-efetividade ao tratamento cirúrgico da STC. ***Nível de Evidência V; Opinião do especialista.***

Descritores: *Síndrome do túnel carpal. Epidemiologia. Terapia. Questionário. Estudos transversais.*

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INTRODUCTION

Carpal tunnel syndrome (CTS) is a major cause of compressive neuropathy, occurring by the compression of the median nerve in the carpal tunnel. Related literature has a large number of publications, ranging for etiology investigation to less invasive treatment options. As the condition is frequent and impacts in function and quality of life, best evidence efforts should be considered to optimize cost reduction and clinical effectiveness. However, literature is conflicting regarding to CTS management and consensus initiatives have not reached the hand surgeon routine, which incurs in substantial

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heterogeneity in practice, fact that is relevant from the health policy perspective. Systematic reviews conclude that there is not enough evidence to enable decision making on the best methods of diagnosis and treatment.[1-3] Motivated by the clinical importance of the disease and the absence of conclusive scientific substrate that allow the elaboration of an definitive algorithm for CTS diagnosis and treatment, we idealized this study with the objective of assessing the opinion of hand surgery specialists in 36th Brazilian Congress of Hand Surgery (BCHS), regarding to CTS management.

METHOD

A total of 350 questionnaires were distributed during the 36th BCHS, with 18 objective questions about the main aspects of diagnosis and treatment for CTS. (Annex 1) As inclusion criterion, only the questionnaires answered in full were considered and from board-certified members. Participants were invited to participate, in a random form. Participation was voluntary and responses were kept confidential. From 350 randomly distributed questionnaires, 101 were excluded because they were incomplete, 44 filled out by non-specialists from Brazilian Society of Hand Surgery (BSHS) and 31 filled out by resident physicians, resulting in the final inclusion of 174 questionnaires.

Statistical analysis

Results were computed and submitted to statistical analysis. To estimate the sample size, we considered an expected proportion of 10% from the total number of members of the society, considering a 95% confidence interval and a alpha as 5%, sample size resulted in the need to consider 158 questionnaires. The variables were analyzed descriptively through the observation of the values and percentage calculation.

RESULTS

There were 694 participants on 36th BCHS, being 387 members of the BSHS. Most of the participants practice were in the southeast region (Figure 1) and have less than 10 years of experience as a hand surgery specialist. (Figure 2)

Regarding conservative treatment, 82% of surgeons answered that they had had conservative treatment before surgery in at least half of the patients. (Table 1) Regarding conservative treatment time, 55% considered treatment for 5-8 weeks and 25% for 9-12 weeks. (Table 1)

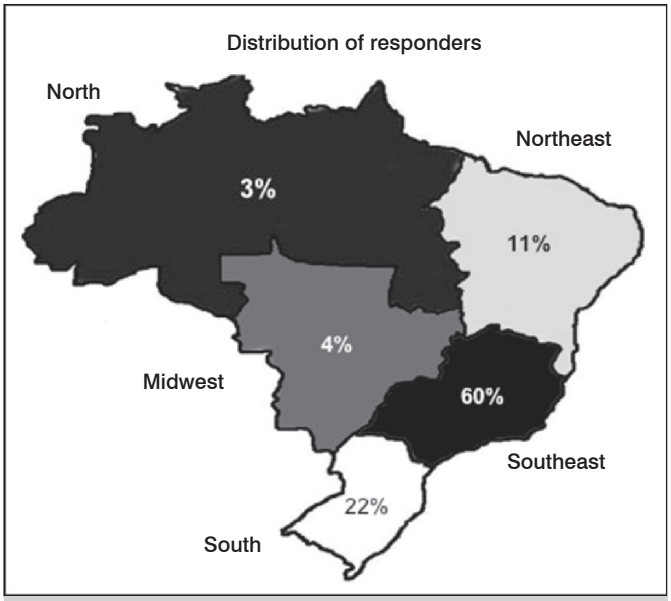

Figure 1. Distribution of responders.

Most applied non-surgical treatment was night splinting (90%) associated or not with non-steroidal anti-inflammatory drugs (56%) and/or intramuscular corticosteroid (55%) and/or corticosteroid local injection in the carpal tunnel (33%). (Table 1)

Most of the participants (58%) always performed electrodiagnostic test in addition to clinical diagnosis. (Figure 3)

The vast majority of the interviewees (93%) performed surgeries in the main operating room with hospitalized patients and half of those used a prophylactic antibiotic. (Table 2)

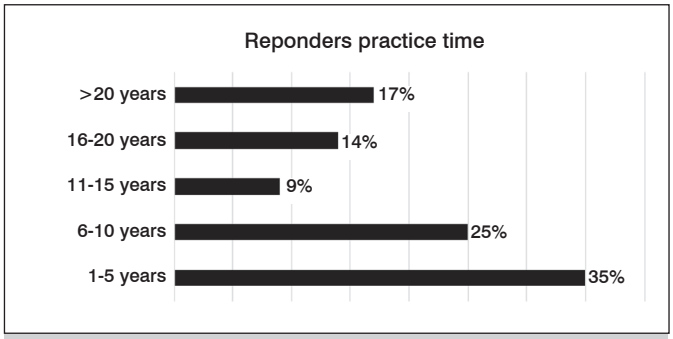

Figure 2. Responders practice time in hand surgery speciality.

Table 1. Patient selection and non-surgical treatment.

Percentage of patients with conservative treatment before surgery.	
Alternatives	**Answers**
a) 0%	1%
b) 25%	17%
c) 50%	40%
d) 100%	42%
Modalities for non-surgical treatment of CTS (more than one alternative is possible).	
Alternatives	**Answers**
a) Intramuscular corticosteroid	55%
b) Diuretics	1%
c) *NSAIDs*	56%
d) Local corticosteroid injection	33%
e) Night splint	90%
Conservative treatment time.	
Alternatives	**Answers**
a) <1 week	0
b) 1-4 weeks	13%
c) 5-8 weeks	55%
d) 9-12 weeks	25%
e) >12 weeks	14%

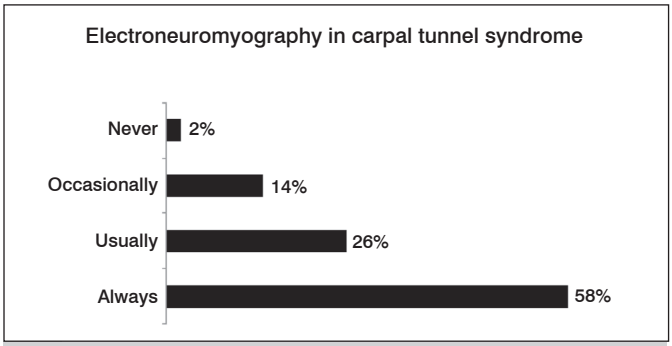

Figure 3. Use of electrodiagnostic test in CTS.

Table 2. Surgical technique.

Surgeries performed outside main operating room (hospital setting)	
Alternatives	Answers
a) never	93%
b) 1-25%	4%
c) 26-50%	3%
d) 51-75%	0%
e) 76-99%	0%
f) 100%	0%
Prophylactic antibiotic utilization	
Alternatives	Answers
a) yes	50%
b) no	50%
Hemostasis review prior to wound closure (after deflate the tourniquet)	
Alternatives	Answers
a) yes	28%
b) no	72%
Surgeries performed by classical open surgery in the last year	
Alternatives	Answers
a) never	14%
b) 1-25%	14%
c) 26-50%	5%
d) 51-75%	8%
e) 76-99%	13%
f) 100%	52%
Surgeries performed by retinaculotome	
Alternatives	Answers
a) never	68%
b) 1-25%	11%
c) 26-50%	6%
d) 51-75%	6%
e) 76-99%	5%
f) 100%	4%
Surgeries performed by endoscopic technique	
Alternatives	Answers
a) never	58%
b) 1-25%	18%
c) 26-50%	5%
d) 51-75%	4%
e) 76-99%	8%
f) 100%	4%
Single portal (Agee)	90%
Double portal (Chow)	10%
Canal flexor tenolysis	
Alternatives	Answers
a) never	40%
b) sometimes	39%
c) frequently	6%
d) always (if necessary)	13%
Antebrachial fascia openning	
Alternatives	Answers
a) yes	65%
b) no	35%

Regional anesthesia is the most used (45%), followed by local (33%) and general anesthesia (22%). Among the participants who opted for regional anesthesia, the majority (79%) preferred to use the technique described by Bier (intravenous regional anesthesia), followed by peripheral nerve block (21%). Of those who chose local anesthesia, the largest proportion chose to use lidocaine (46%), without vasoconstrictor (72%), associated with sedation (86%) and with tourniquet use (90%). (Figure 4)

As for the surgical technique, considering the participants who answered that they perform a certain surgical technique in more than half of cases, we found that open surgery was the most used (73%), followed by the endoscopic surgery (16%) and mini-open with the aid of a retinaculotome (15%). Surgeons who perform the endoscopic technique have wide preference for the Agee single portal technique. (Table 2)

In open surgery, in addition to the opening of the transverse carpal ligament, most of the participants (65%) performed opening of the proximal antebrachial fascia and only 13% perform routine flexor tenolysis. (Table 2) Only 17% of hand surgeons perform routine median nerve neurolysis, while 41% said they never perform. (Figure 5) Removal of the tourniquet for hemostasis review was not performed routinely by most of participants (72%), regardless of the anesthetic technique. (Table 2). The majority of participants (98%) did not use corticosteroid in the carpal tunnel before wound closure and did not use drains. (Table 3)

Regarding postoperative care, the majority (67%) of the participants use compressive dressing (table 3) most of the time for 7 days. (Figure 6) Among the adjuvant treatment modality, the most used (73%) in the postoperative period were analgesics between 5 and 7 days, followed by non-steroidal anti-inflammatory drugs (NSAIDs) (62%) between 5 and 7 days and splinting (38%) between 5 - 15 days. (Figure 6)

DISCUSSION

Our results were representative of the demographical distribution of the participants members of BSHS. The majority are young specialists practicing in the southeast region. Non-surgical approach of CTS is performed by the vast majority of participants. The treatment time between 5-8 weeks is consistent with other studies with a similar methodological design.[1,4]

For non-surgical treatment, the vast majority of the interviewees use night splint (90%) and NSAIDs (56%), supported by good evidence from the literature.[5,6] Studies with good methodological quality have shown that corticosteroid local injection in the carpal tunnel is also a safe and effective procedure for regression of symptoms for up to 12 months, besides being a good parameter to infer the prognosis of the surgical treatment.[1,7] Despite this benefit only 1/3 of Brazilian hand surgeons report using it routinely.

Regarding diagnostic methods, although clinical examination and CTS6[8] score prove to be good diagnostic tools, most (58%) of the interviewees use electromyography as a routine in the diagnosis of carpal tunnel syndrome, which is consistent with other authors suggesting that this is the most accurate non clinical diagnostic tool.[9]

In Brazil, the surgical treatment of CTS is performed most often in a main operating room sterility (hospital setting) with intravenous regional anesthesia (Bier). The research with US hand surgeons has described that they perform CTS surgery also in a hospital setting, but they frequently use local anesthesia, sedation and tourniquet.[4] However, in the last decade some studies have described the procedure in an minor procedure rooms (ambulatory setting) with field sterility under pure local anesthesia, mostly without tourniquet and with lidocaine with epinephrine. They found substantial cost reduction and wait times for surgery, increased patient and

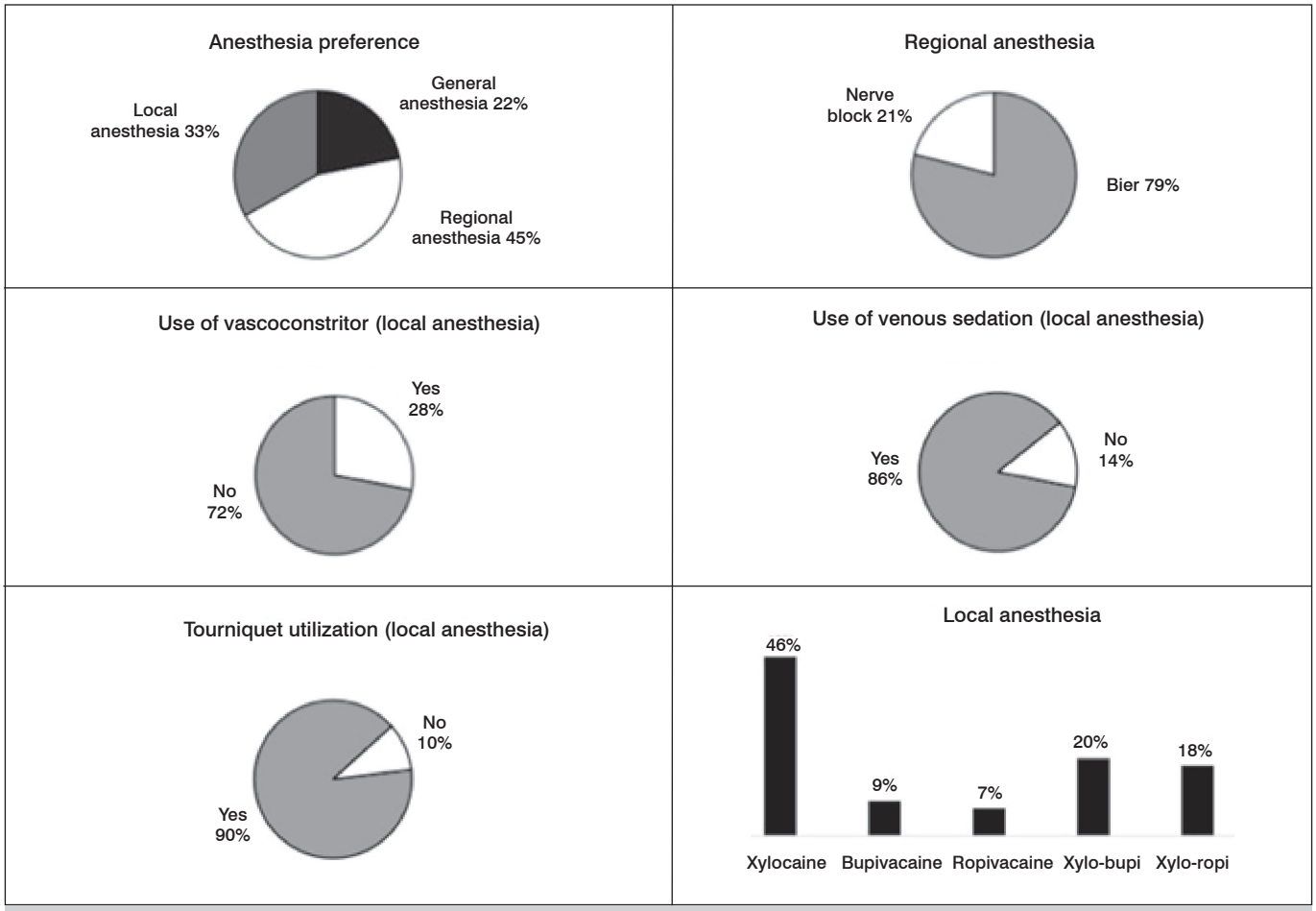

Figure 4. Anesthesia preference for CTS surgery.

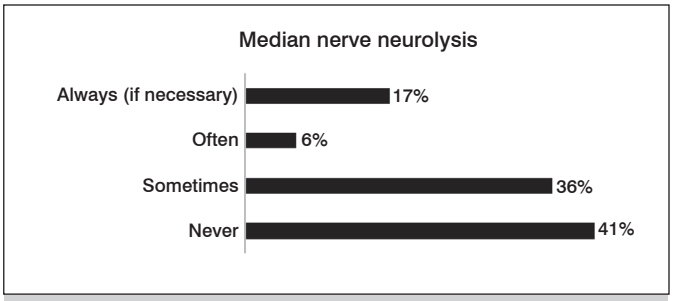

Figure 5. Preference regarding to median nerve neurolysis.

Tabela 3. Postoperative.

Corticosteroid intracanal before wound closure	
Alternatives	Answers
a) yes	2%
b) no	98%
Postoperative drain utilization	
Alternatives	Answers
a) yes	2%
b) no	98%
Postoperative compressive dressing	
Alternatives	Answers
a) yes	67%
b) no	33%

surgeon convenience, but has not increased wound infection rates, which leads us to reflect on the need for comparative studies in our environment about safety and cost-effectiveness of these methods.[10,11,12] There is currently the need to optimize the use of the resources available in our Health System, both in the public and private sectors. We believe this is an important subject of research. Although there is conclusive evidence on the inefficacy of prophylactic antibiotic use in CTS surgeries, even in patients with diabetes, we found in our results that half of Brazilian hand surgeons use prophylactic antibiotics.[13] Similar study described that 35% of US surgeons use routine preoperative antibiotics for CTS surgery.[4]

Most Brazilian and American surgeons do not release the tourniquet before wound closure.[4] However, we have to consider that this surgical step is generally not possible in cases of anesthesia with the Bier technique nor when the surgical technique chosen is retinaculotome or endoscopic. The tenolysis also cannot be performed with the endoscopic and mini open techniques with the aid of retinaculotome.

The endoscopic surgical technique was chosen as preferred by 16% of respondents, lower index when compared to the American study with a similar methodological design[4]. The retinaculotome technique was the one that had greatest rejection, 68% of the participants report that they never use it. However, there are studies that show that patients operated by the retinaculotome technique were satisfied with the surgical outcome.[14] The AAOS American Academy conducted a review of the literature and concluded that there was strong evidence recommending surgical treatment of

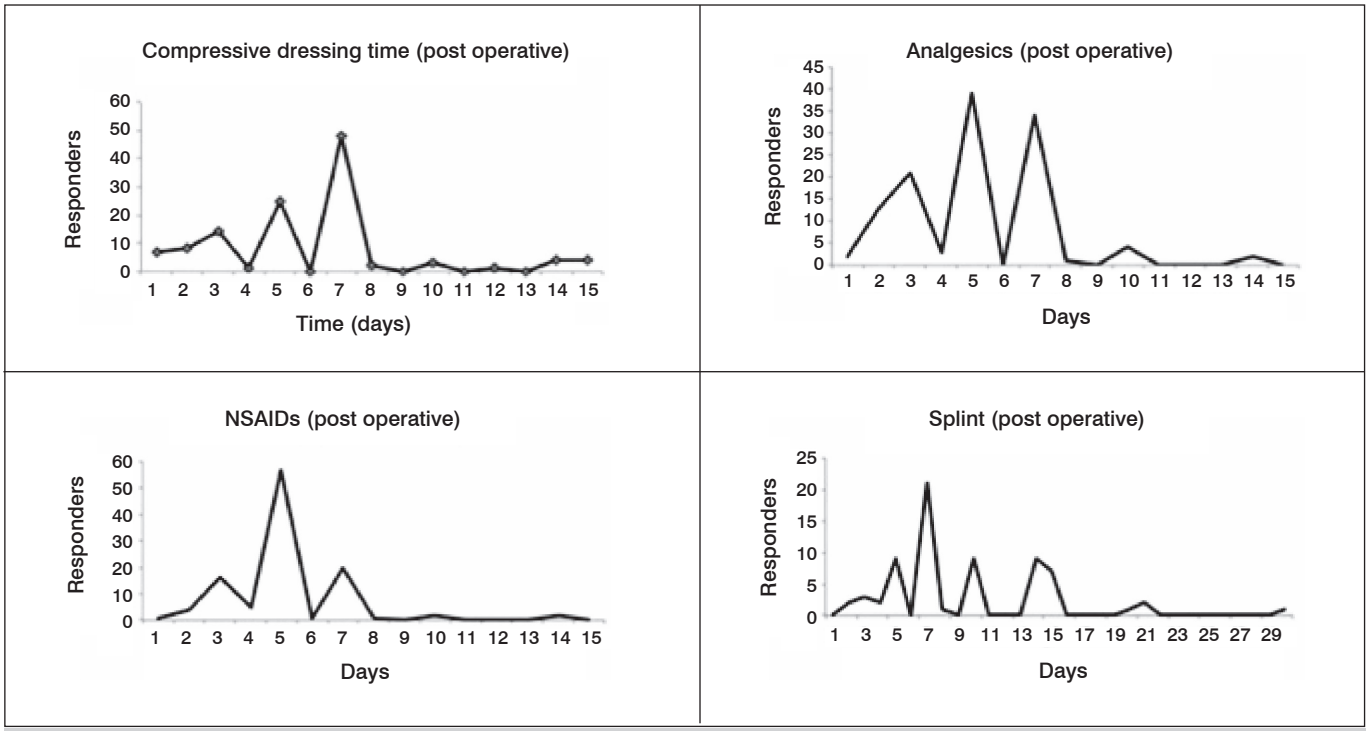

Figure 6. CTS postoperative care preferences.

carpal tunnel syndrome by fully opening the flexor retinaculum regardless of the surgical technique chosen.[1,15]

Following the precepts of Phalen we found that 65% of participants open the antebrachial fascia. The author in his description of the surgical technique emphasized the importance of the complete incision of all distal extension of the roof of the carpal tunnel and also of the proximal fascia to the transverse carpus ligament. His studies suggest that the proximal and distal aspects of the fascia are important sources of carpal tunnel syndrome.[16] Further studies show that the transition area between the forearm fascia and the transverse carpal ligament is the most likely site of flexion-induced deformation of the median nerve and may be responsible for the challenge of the Phalen signal.[17] However no statistically significant difference was found in carpal tunnel pressure after release of the proximal portion of the flexor retinaculum in the resting position or with palmar grip strength.[18]

According to the international literature 41% of the respondents answered that they never perform the neurolysis of the median nerve. Studies concluded that internal neurolysis does not add significant improvement in the sensory or motor outcome of patients with carpal tunnel syndrome.[19]

In our setting, concomitant procedures following surgical release such as corticosteroid intracanal before wound closure and drainage placement are rarely performed (2%), while tenolysis and neurolysis are occasionally performed. Our results are in agreement with other studies with similar methodological design.[1,4]

As an hemostatic measure we found that 67% of the interviewees used compressive dressing in the postoperative period for approximately 7 days. A recent study concluded that the use of a bulky dressing after open surgery (mini-incision) for carpal tunnel syndrome and replacement with a tape in 48 to 72 hours does not cause wound complications and the clinical outcome is the same compared to wearing a dressing bulky for 2 weeks.[20]

We found the least used postoperative treatment modality was immobilization (38%) which is in line with that proposed by the American guideline.[1]

Some limitations of this study are the possibility that the response of the participants was conditioned to the economic power of the region where it operates, generating discrepancy in the diagnosis and treatment of patients with carpal tunnel syndrome in some centers in relation to others. The fact that the research was carried out in a scientific congress may have generated a potential selection bias in relation to the interest / academic training of the interviewees present to the detriment of those who did not participate. In the questionnaire, ultrasound was not evaluated as a diagnostic tool.

CONCLUSION

Most of the hand surgeons use routine electroneuromyography for diagnosis. Conservative treatment is considered between 5-12 weeks and there is predilection for prescription of night splint and NSAIDs.

Most commonly performed is open surgery, with intravenous regional anesthesia (Bier) associated with antebrachial fascia opening and compressive dressing for one week.

Surgeons and health care policy makers should be aware about a local corticosteroid injection non-surgical treatment, the ineffectiveness on the use of prophylactic antibiotics, high costs of ward hospitalization and the need standardization of anesthesia methods in order improve cost-effectiveness in the CTS treatment scenario.

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Annex 1.

How do board-certified hand surgeons manage carpal tunnel syndrome? A national survey.
( ) Hand surgery specialist ( ) Resident ( ) Other

Please indicate your region and performance time (hand surgery)
( ) Southeast ( ) South ( ) Midwest ( ) Northeast ( ) North
( ) 1-5 years ( ) 6-10 years ( ) 11-15 years ( ) 16-20 years ( ) >20 years

Selection of patients and non-surgical treatment

1. What percentage of patients had conservative treatment, by you or another specialist before surgery?
a) 0% b) 25% c) 50% d) 100%

2. What types of non-surgical treatment do you use for CTS? More than one alternative is possible.
a) Intramuscular corticosteroid
b) Diuretics
c) *NSAIDs*
d) Corticosteroid local injection
e) Night splint

3. Conservative treatment in weeks?
a) < 1 b) 1-4 c) 5-8 d) 9-12 e) >12

4. When do you use electromyography?
a) Always b) Usually c) Ocasionally d) Never

Surgical Technique

5. How many surgeries are performed outside sterility main operating room (hospital setting)?
a) 0% b) 1-25% c) 26-50% d) 51-75% e) 76-99% f) 100%

6. Do you use routine prophylactic antibiotics?
a) Yes b) No

7. What type of anesthesia do you prefer?
a) General anesthesia
I. tourniquet use II. without tourniquet

b) Regional anesthesia
I. BIER II. nerve block

Local anesthesia
Anesthetic?_____
I. vasoconstrictor II. without vasoconstritor
I. sedation II. without sedation
I. tourniquet II. without tourniquet

8. Do you deflate the tourniquet for hemostasis review prior to wound closure?
a) Yes b) No

9. How many surgeries have been performed by classical (open) surgery in the last year?
a) 0% b) 1-25% c) 26-50% d) 51-75% e) 76-99% f) 100%

10. How many surgeries have been performed using retinaculotome?
a) 0% b) 1-25% c) 26-50% d) 51-75% e) 76-99% f) 100%

11. How many surgeries have been performed by endoscopic technique?
a) 0% b) 1-25% c) 26-50% d) 51-75% e) 76-99% f) 100%

I. single portal (Agee) II. double portal (Chow)

12. Do you perform canal flexor tenolysis?
a) Never b) sometimes c) frequently d) always (if necessary)

13. Do you do neurolysis of the median nerve?
a) Never b) sometimes c) frequently d) always (if necessary)

14. Do you open the antebrachial fascia?
a) Yes b) No

15. Do you instill corticosteroid intracanal before wound closure?
a) Yes b) No

16. Do you use a drain?
a) Continuous suction drain
b) Penrose
c) Never

Postoperative care

17. Do you apply postoperative compressive dressing?
a) Yes. How long? _____ days b) No

18. Which treatment is applied in the postoperative period and how long? More than 1 alternative is possible.
a) Analgesics – ___ days.
b) NSAIDs – ___ days.
c) Night splint – ___ days.