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Original Article

Conventional Surgery Versus Endoscopic Surgery for the Treatment of Carpal Tunnel Syndrome at the Moulins-Yzeure Hospital (France): A Study of 1140 Cases

Chirurgie Conventionnelle Versus Chirurgie Endoscopique dans le Traitement du Syndrome du Canal Carpien au Centre Hospitalier de Moulins-Yzeure (France) : À Propos de 1140 observations

Mungina SL[1,2,*], Dumez JF[2], Moumouni I[2], Kibadi K[1]

[1]. Department of Plastic and Hand Surgery, University Clinics of Kinshasa, Faculty of Medicine, University of Kinshasa, Democratic Republic of Congo

[2]. Moulins-Yzeure Hospital Center, 10 avenue du Général de Gaulle, 03006 Moulins cedex, France

***Auteur correspondant** :
Saint Luc Mungina
Email: sedoumunginasab@gmail.com
Tel: (+243) 898 000 575

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ABSTRACT

Aim. To compare conventional surgery to endoscopic surgery in the treatment of carpal tunnel syndrome at the Moulins-Yzeure Hospital (France). **Methods**. This was a retrospective study of 1140 cases of carpal tunnel syndrome treated surgically by endoscopy and open surgery in the Orthopedics - traumatology surgery department of the Moulins-Yzeure Hospital Center/France for eight years, from January 2010 to December 2020. **Results**. The majority of patients are female, i.e. 79.8% (910/1140) with a sex ratio of 2.9. The 46-55 age group constitutes the modal class representing approximately 22.8% of our sample. The average age is 58.6 ± 16.4 years. The causes of carpal tunnel syndrome are dominated by the idiopathic form at 88%. The release of the annular carpal ligament by the open surgical technique is used in 88.59% of cases. The average duration of interventions is 27.3±44.8 minutes with the extremes of 15 and 40 minutes. Around 84% of interventions only lasted 15 minutes or less. The results of the surgery were satisfactory in 97% during the first evaluation, one month postoperatively and after 2 years. **Discussion**. Conventional surgery remains accessible, effective, requires little equipment and gives good results at low cost when performed correctly. The failure or persistence of the symptoms also reported in other series shows us the importance of making the diagnosis early. Regardless of the surgical technique used, conventional or endoscopic; the installation of patients and the use of the tourniquet are done in the same way. Patient care is provided on an outpatient basis in the majority of cases. Skin closure is generally carried out in one plane using a 4/0 non-absorbable suture with a drainage system (Manovac). **Conclusion**. We did not encounter intraoperative lesions as described in the literature and found by certain authors.

RÉSUMÉ

Objectif. Comparer la chirurgie conventionnelle à la chirurgie endoscopique dans le traitement du syndrome du canal carpien au Centre Hospitalier de Moulins-Yzeure (France). **Méthodologie**. Il s'agit d'une étude rétrospective de 1140 cas de syndrome du canal carpien traités chirurgicalement par endoscopie et chirurgie ouverte dans le service d'orthopédie - chirurgie traumatologique du Centre Hospitalier de Moulins-Yzeure/France pendant huit ans, de janvier 2010 à décembre 2020. **Résultats**. La majorité des patients sont des femmes soit 79,8% (910/1140) avec un sex-ratio de 2,9. La tranche d'âge 46-55 ans constitue la classe modale représentant environ 22,8% de notre échantillon. L'âge moyen est de 58,6 ± 16,4 ans. Les causes du syndrome du canal carpien sont dominées par la forme idiopathique à 88 %. La libération du ligament annulaire carpien par la technique chirurgicale ouverte est utilisée dans 88,59 % des cas. La durée moyenne des interventions est de 27,3 ± 44,8 minutes avec des extrêmes de 15 et 40 minutes. Environ 84 % des interventions n'ont duré que 15 minutes ou moins. Les résultats de l'intervention chirurgicale étaient satisfaisants à 97 % lors de la première évaluation, un mois après l'opération et après 2 ans. **Discussion**. La chirurgie conventionnelle reste accessible, efficace, nécessite peu de matériel et donne de bons résultats à faible coût lorsqu'elle est pratiquée correctement. L'échec ou la persistance des symptômes également rapportés dans d'autres séries nous montrent l'importance de poser un diagnostic précoce. Quelle que soit la technique chirurgicale utilisée, conventionnelle ou endoscopique, l'installation des patients et l'utilisation du garrot se font de la même manière. Les soins aux patients sont dispensés en ambulatoire dans la majorité des cas. La fermeture cutanée est généralement réalisée dans un seul plan à l'aide d'un fil de suture 4/0 non résorbable avec un système de drainage (Manovac). **Conclusion**. Nous n'avons pas rencontré de lésions peropératoires telles que décrites dans la littérature et retrouvées par certains auteurs.

HIGHLIGHTS OF THE STUDY

What is known about the subject:
There are 3 types of treatment for carpal tunnel syndrome (CTS), classified according to each case into prophylactic, conservative or medico-surgical treatment.
The question addressed in this study:
Do all CTS patients find the same satisfaction after surgery regardless of the surgical technique used?
What this study brings new:
There are no significant differences between conventional surgery and endoscopic surgery in the treatment of CTS
Implications for practice, policy or future research:
Conventional or arthroscopic surgery can be used equally in the treatment of CTS

INTRODUCTION

Carpal tunnel syndrome is caused by compression of the median nerve. Compression may be caused by swelling of the tissue around or within the canal, or by the formation of strings of fibrous tissue on the palmar side of the wrist. It was only in 1913 that Pierre Marie and Charles Foix [1] in a communication to the neurology society described the compression syndrome of the median nerve for the first time and were the first to mention the anterior annular ligament of the carp as a "determining agent". They recommended the sectioning of this ligament which would be sufficient to stop the evolution of the phenomena. In 1957, Georges PHALEN clearly described carpal tunnel syndrome as well as the maneuver he developed to diagnose this pathology. He emphasizes the increase in pressure in the carpal tunnel which justifies the compression. Together with HENDRICK, they finally propose intraductal injection of corticosteroids before surgery and emphasize their beneficial role in the treatment of carpal tunnel syndrome because they noted spectacular results but a significant risk of recurrence [2].
There are 3 types of treatment for CTS, classified according to each case into prophylactic, conservative or medical and surgical treatment. The natural evolution of SCC, although poorly understood, can lead to spontaneous disappearance (34% in certain series). Do patients suffering from carpal tunnel syndrome all find satisfaction in the same way after surgery despite the use of different surgical techniques (open and endoscopic)?
The aim of this study is to compare conventional and arthroscopic surgery in the surgical management of carpal tunnel syndrome by analyzing the surgical techniques, the results and evaluating the postoperative recovery of patients according to the different techniques applied.

MATERIAL AND METHODS

This single-center retrospective study, which covers 1140 cases of carpal tunnel syndrome treated surgically by endoscopic means and by the open technique, was carried out in the orthopedic and trauma surgery department of the Moulins – Yzeure Hospital Center in France during the period from from January 2010 to December 2020.
The population of our study consisted of all patients who underwent release of the anterior annular carpal ligament by conventional or endoscopic means in the orthopedic and trauma surgery department of this health establishment during the period of our study.
The sampling of this study is exhaustive but also of convenience with consecutive recruitment of all patients. We consulted the administrative files, consultation and hospitalization letters, operative reports and EMG analyzes of 1140 cases operated on in the orthopedic and trauma surgery department of CHMY in France. We also contacted patients to have their latest news and to give us additional information on their progress.
Data from the patient files consulted were collected according to a pre-established questionnaire in which the following parameters were collected:
Epidemiological data: Age; gender; Facilitating factors; Background; Associated pathologies
Clinical data: Uni or bilateral disorders; Dominant side. ; Duration of symptoms at the time of consultation; Typical or atypical nature of clinical manifestations and their association with other symptoms; Etiologies encountered;
Clinical examination data; Carrying out corticosteroid infiltrations.
Paraclinical data: EMG; Other additional examinations.
From a surgical point of view: Type of anesthesia applied; Use of the pneumatic tourniquet; Operating technique, arthroscopy or conventional; Post-operative care;
Evolution and complications
Intraoperative: Vascular section or lesion, Nerve section or lesion; Section or tendon injury; Appearance of the median nerve; Presence or absence of inflammation; Carpal tunnel diagnosis
Postoperative: Infection, Disunion of the scar, Skin necrosis, Hematoma and edema, Algodystrophy, Recurrence, Hypertrophic scar, Fibrosis, Persistence of symptoms or therapeutic failure.
The data collected had undergone a quality control which consisted of verifying the accuracy of the observations and information, then they were recorded in Excel and analyzed by statistical software: SAS, File or chi square system.
The results were expressed as mean +/- standard deviation for quantitative variables or percentage for qualitative variables.

RESULTS

Among the 1140 patients studied, the majority of patients are female, i.e. 79.82% (910/1140) compared to 20.18% for men with a sex ratio of 2.9.
Table 1 gives the distribution of patients according to age groups.

Table 1: Distribution of patients according to age groups

Variable (n=1140)	N	%
Patients according to age groups (year)		
≤ 25	10	0.88
26_35	50	4.39
36_45	220	19.30
46_55	260	22.81
56_65	220	19.30
66_75	150	13.16
76_85	170	14.91
86_95	60	5.26

The 46-55 age group constitutes the modal class representing approximately 22.8% of our sample. The average age of patients is 58.6 ± 16.4 years.
The majority of patients were affected in only one hand and operated unilaterally in 77%.
91% of patients operated on for carpal tunnel syndrome had not previously received preoperative treatment. The release of the anterior annular carpal ligament in the surgical management of carpal tunnel syndrome is isolated in 84% of cases. The majority of patients did not present another pathology requiring an additional procedure in 88.6% of cases.
The causes of carpal tunnel syndrome are idiopathic in 88% of cases. The right hand represents the side most operated on in 52% of cases.
Conventional surgery is the most used technique in 96.49% of cases in the surgical management of carpal tunnel syndrome. The average duration of the operation is 27.3±44.8 minutes with a minimum and maximum duration of 15 and 40 minutes. Note that approximately 69.29% of operations lasted only 15 minutes.
Surgical treatment of carpal tunnel syndrome is done on an outpatient basis in 92.98%. The results were satisfactory (disappearance of symptoms) in 92% after evaluation of the patients at the first check-up one month postoperatively. After 2 years, 97% of patients achieved complete recovery.
Table 2 presents a comparison of two techniques, open surgery and endoscopic surgery.

Table 2: Analysis and comparison of variables according to techniques

Settings		Conventional surgery	Endoscopic surgery	Total
Frequency		1100(96.49)	40(3.5)	1140
Tourniquet		1100(100)	40(100)	1140
Type of anesthesia	GA	30(75), (2.63)	10(25), (0.85)	40(3.5)
	RLA	1030(97.16), (90.35)	30(2.83), (2.63)	1060(92.98)
	LA	40(100), (3.5)	0(0), (0)	40(3.5)
Operating time		Less than 20 min More than 30	Less than 20 min More than 30	
Aspect of the nerve		Clearly visible	Undifferentiated	
Stays	Ambu	1020(92.72)	40(100)	1060(92.98)
	Hosp 1j	80(7.27)	0	80(7.01)
	GA	30(37.5), (100)	0	
	RLA	50(62.5), (4.85)	0	
Recurrence		10(0.9)	1(2.5)	20(1.75)
Failure		10(0.9)	0	10(0.87)

Conventional surgery was performed in 96.49% of cases and the operating time was reduced but also good visibility of the inflammatory nature of the nerve, the inflammatory fluid was observed.
The tourniquet was used in 100% of cases regardless of the technique used.
Locoregional anesthesia was the most used in 97.16%.
92.98% of patients underwent outpatient surgery. The 7.27% of patients who had been hospitalized for one day had all benefited from GA but also from an additional procedure, therefore neurolysis of the median nerve associated with that of the ulnar nerve despite the fact that other patients had returned home. The same day of the intervention (50/130).

DISCUSSION

Socio-democratic aspects

In our series, the 46-55 age group constitutes the modal class representing approximately 22.8% of our sample. This is either inclusive of or similar to the predilection of the 40-60 age group found by PETIO et al [3] [4] and between 40-70 found by DUDLEY and other authors [5] [6].

The average age is 58.6 ± 16.4 years, this is close to the average age of 45 years with the extremes of 20 to 84 years [5] [6]. This confirms the idea of some authors who described carpal tunnel syndrome as a common condition during the fifth decade. SEROR P [7] carried out a study in subjects over 70 years old and found a higher clinical severity and a new atypical clinical presentation which is exclusive daytime paresthesia.
On the other hand, SCOTT BLUMENTHAL et al [8], in his study (prevalence of carpal tunnel syndrome in elderly subjects), found that, in elderly subjects (over 65 years), carpal tunnel syndrome occurs with more severe compression of the median nerve, in terms of motor deficit and conduction abnormalities on EMG; yet there are no differences regarding subjective signs.
In our series, we note a female predominance of carpal tunnel syndrome at 79.82%. This result is similar to those described in the literature that carpal tunnel syndrome is a predominantly female condition with a sex ratio 3/1 [9].
Our study shows that the causes of carpal tunnel syndrome are idiopathic in 88% of cases and diabetes is the first factor favoring carpal tunnel syndrome at approximately 5% followed by other factors at less than 1% each, notably osteoporosis. , wrist fracture etc. This result on diabetes is

similar to data in the literature where diabetes represents, according to the authors, a frequency of between 1 and 23% [8] [9].
Some authors have highlighted in their case-control study of 791 carpal tunnel syndrome a strong and independent association of the risk of occurrence of carpal tunnel syndrome with the female sex, in particular outside of any obesity; this risk was further increased in the case of diabetes.
KAPLAN Y et al [10] suggested that age at menopause may be a significant factor in the development of Carpal Tunnel Syndrome. Hormonal changes related to pregnancy can have long-term effects that increase the incidence of carpal tunnel syndrome in postmenopause.
It demonstrated that women with carpal tunnel syndrome experienced menopause at a younger age and that there was a strong and significant positive correlation between the duration of CTS and menopause. Among hemodialysis patients, ALLIEU et al (12) found a male predominance [11].

Open versus laparoscopic surgery

We did not find significant differences when comparing the results obtained in the practice of the two operating techniques (conventional surgery and endoscopic surgery) used in the surgical management of carpal tunnel syndrome. There was a therapeutic failure, namely the persistence of symptoms in a subject operated by endoscopy and two cases of recurrence in patients operated with the open technique. We cannot consider that there is a difference because the sample size is not the same for the two techniques. On the other hand, the conventional, open technique is the oldest, the most used in our series, does not require too much equipment, has more advantages because it gives direct access with a good view of the carpal tunnel and its contents. ; the operating time is reduced, this is not the case with endoscopic surgery (arthroscopy) which requires quite expensive equipment, with limited access, a long operating time by combining the installation but also additional training. Its advantage is that the incision could be small, avoiding the scar in the palm of the hand and can allow the patient to follow the procedure on the screen. This observation is also made by certain authors in the literature who do not find differences between conventional surgery and endoscopic surgery in the management of carpal tunnel syndrome. HALLOCK and LUTZ did not show a significant difference between two techniques in terms of recovery and speed of return to daily activities [12].
In Agee's study [13], 2 incomplete results required open surgery providing a complete result in 1 case and incomplete in the other, and 2 transient ulnar neurapraxias were observed.

Medical rest or sick leave

In our series, whatever the technique, the work stoppage was 30 days, so there is no difference for return to work in the two groups. Our results are similar to those of Dumontier in France, 1995 who despite his study had consisted of the two-way technique described by Chow had not found a significant difference between the groups (open surgery versus two-way endoscopic surgery described by Chow in 1993 (extrabursal) for the average duration of work stoppage [14] [15].
On the other hand, the other authors found that the duration of work stoppage was longer with the application of conventional surgery.
Agee, in the United States, in 1992 in his study carried out between conventional surgery versus endoscopic surgery in the subgroup of 79 patients having had a unilateral intervention and being active, (49 endoscopy, 30 open surgery) he found that the duration of sick leave was longer for conventional surgery with a median of 46.5 days compared to 25 days for the endoscopy group. These results are different from those found by Brown in the United States, 1993 Conventional open surgery versus two-way endoscopic surgery, the return to work of which was faster in the endoscopy group with a median of 14 days versus 28 days in the surgery group. open air.
Erdmann in Great Britain in 1994 and Chow in 1989 compared open surgery versus endoscopic surgery, and the two approaches described. In the group evaluated (B in the study) (27 conventional surgery hands and 28 endoscopic surgery), average return to work time of 14 days for patients treated by endoscopic surgery versus 39 days for patients treated by conventional surgery
Léger in France in 2000 also compared 1-way endoscopic surgery. According to Agee, (group 1) versus open surgery with plasty according to Jakab (group 2) versus open surgery by isolated section of the anterior annular carpal ligament (group 3) In group 1: average of 14 days off of work [13], in group 2: average of 30 days [13-48], in group 3: average of 42 days [13];
It appears that medical rest or sick leave is shorter with endoscopic surgery. But, there is no statically significant long-term difference in functional outcome between open surgery and endoscopic surgery.

CONCLUSION

Surgical treatment remains the only effective means of treating carpal tunnel syndrome; it is generally carried out on an outpatient basis. There are several techniques for releasing the median nerve in the carpal tunnel without any of them having probably shown its superiority in terms of medium and long-term results.
This present study does not show significant differences in results between conventional and endoscopic surgery. The subjective symptomatology improves in around thirty days postoperatively. After two years, the results for the two techniques, open surgery and endoscopic surgery, are identical and satisfactory.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest

REFERENCES

1.ANAES. Chirurgie du syndrome du syndrome du canal carpien idiopathique : Etude comparatives des techniques à ciel ouvert et des techniques endoscopiques. Publication de l'Agence Nationale d'Accréditation et d'Evaluation en Santé, Décembre 2000 : 1-71.
2.DRAPE JL, COTTEN A, CHEVROT A. Intérêt de l'IRM dans les syndromes canalaires du membre supérieur. Chirurgie de la main, 2004; 23: 15 – 26.

3. PETIOT P, BERNARD E. Pièges diagnostiques du SCC. Revue neurologique. 2011. Jan; 167 (1): 64 – 71. PubMed/ Google scholar.
4. EBELIN M. Syndrome du canal carpien. Le point de vue du Chirurgien. RevNeurol(Paris), 2007 ; 163 : 1260 – 62.PubMed/ Google Scholar
5. DUDLEY PORRAS AF, ALAMINOS PR, VINUALES JI, RUIZ VILLAMANAN A. Value of electrodiagnostic tests in carpal tunnel syndrome. J Hand Surg, 2000; 25B(4) :361 – 65. (16).
6. LEVIET D, GANDON F. Syndrome du canal carpien chez l'hémodialysé: analyse de 110 cas opérés. Chirurgie 1992; 118: 546 – 50.
7. SEROR P. Echographie, éléctroneuromyographie et syndrome du canal carpien: concurrence ou complémentarité ? revue du Rhumatisme, 2006 ; 73 : 1324 – 30.
8. BLUMENTHAL S, HERSKOVITZ S, VERGHESE J. Carpal tunnel syndrome in older adults. Muscle Nerve, 2006; 34(1): 78 – 83.
9. MONDELLI M, GIANNINI F, GIACCHI M. Carpal tunnel syndrome incidence in a general population. Neurology, 2002; 58: 89-99.
10. KAPLAN Y, KURT SG, KARAER H. Carpal tunnel syndrome in postmenopausal women. J. Neuro 1 Sci, 2008; 10(1016): 1 – 5.
11. TUBIANA R. Traité de chirurgie de la main : compression du nerf médian au poignet. Edition : Masson, 1991 ; T4 : 649-19.
12. HALLOCK GG, LUTZ DA. Prospective comparaison of minimal incision "open" and two – portal endoscopic carpal tunnel release. Plast ReconstrSurg1995; 96: 941 – 7.
13. AGEE JM, MC CARROLL HR, NORTH ER. Endoscopic carpal tunnel release using the single proximal incision technique. Hand clin 1994; 10: 647 – 59.
14. FOUCHER G, BUCH N. Syndrome du canal carpien. EMG : appareil locomoteur, 1998 : 14 – 069 6 A10, 6P
15. ROULOT ERIC, BERVEILLER PAUL. Le syndrome du canal carpien concours médical : (Paris). Concours méd: (Paris), 2003, vol.125, n°31 – 32, 1837 – 1842.