

ORIGINAL ARTICLE

HISTOLOGIC FINDINGS IN IDIOPATHIC CARPAL TUNNEL SYNDROME: REPORT OF 209 CASES

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Background- Carpal tunnel syndrome is a common disease with multifactorial etiology. The study of histologic findings of the disease can help us identify its etiologic factor(s). The purpose of this study was to determine whether there are any typical or consistent histologic changes in the transverse carpal ligament or flexor tenosynovium, which contribute to idiopathic carpal tunnel syndrome.

Methods- Two hundred and nine consecutive operations for carpal tunnel syndrome between December 1995 and December 2000 were reviewed retrospectively. All patients had no history of systemic disease and no anatomic anomaly. Using hematoxylin-eosin and Congo red dyes, the sections were stained and reviewed histopathologically.

Results- A total of 176 (84%) patients had benign fibrous tissue, 31 (15%) showed amyloid deposits and 2 (1%) showed mild vascular proliferation.

Conclusion- In idiopathic carpal tunnel syndrome, the ligament and tenosynovium often showed normal histology and there were no typical changes. We believe that inflammation is not a part of the pathophysiologic process in idiopathic carpal tunnel syndrome.

Keywords • carpal tunnel syndrome • flexor tenosynovium • histologic findings
• transverse carpal ligament

Introduction

Entrapment of the median nerve at the level of the wrist in the process of carpal tunnel syndrome may be idiopathic or secondary to physiologic causes or many other conditions such as hypothyroidism, rheumatoid arthritis, diabetes mellitus, sarcoidosis, gout, acromegaly, amyloid deposition, wrist fracture or anatomic anomaly.¹⁻⁴ Considerable variations exist in the histologic appearances of the transverse ligament or tenosynovium, which is reported as typical idiopathic carpal tunnel syndrome or consistent with this diagnosis.

Several sources refer to tenosynovitis as a common finding,⁵ whereas others state that tenosynovitis is a rare finding.⁶⁻⁹ This study was

conducted to determine the presence or absence of inflammation and to identify any typical or consistent histologic changes in idiopathic carpal tunnel syndrome.

Materials and Methods

We included 209 patients (31-76 years of age) between December 1995 and December 2000 who had been treated surgically for idiopathic carpal tunnel syndrome.

All patients were examined clinically. Clinical evaluation included checking for the typical sensory symptoms, Phalen's test and standard muscle tests. All patients with a known systemic disease (e.g., rheumatoid arthritis, hypothyroidism, acromegaly, diabetes mellitus, gout or renal failure) or a previously documented cause for carpal tunnel syndrome were excluded from the study. All of those included were women and were

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not pregnant. None of our patients had any acute or chronic inflammatory disease during the study.

During carpal tunnel release surgery, biopsies were obtained from the transverse carpal ligament and flexor tenosynovium. Specimens were sent to the Department of Pathology (Shariati Hospital, Tehran, Iran) in formalin for fixation. Five-micrometer sections were prepared after paraffin embedding and stained with hematoxylin-eosin and Congo red. The presence of amyloid was noted and was confirmed when a Congo red-stained section showed yellow-green birefringence under polarized light microscopy.

Sections were examined with attention to inflammation, amyloid deposition, mucoid change, chondrometaplasia, fibrosis and vascular changes.

Acute inflammation was defined as the presence of fibrin and or infiltration by neutrophils and chronic inflammation was defined as the presence of lymphocytes, plasma cells, and proliferation of fibroblasts.

Results

Benign fibrous tissue without any pathologic findings was demonstrated in 176 (84%) cases (Figure 1). Furthermore, 31 (15%) cases showed amyloid deposits and two (1%) showed mild vascular proliferation (Figure 2).

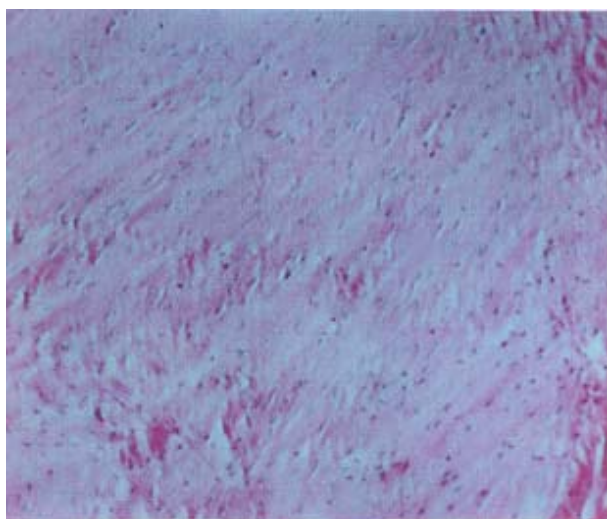


Figure 1. Histologic findings of transverse carpal ligament in idiopathic carpal tunnel syndrome showing fibrous tissue with no significant changes (hematoxylin-eosin, x100).

Discussion

There are considerable differences in the histologic changes of the carpal ligament or tenosynovium in idiopathic carpal tunnel syndrome reported in the literature. Faithfull et al and Fuchs et al frequently noted edema^{10,11} and reported a high incidence of vascular sclerosis.¹¹ Schuind and colleagues showed a high incidence of synovial hyperplasia.¹² In contrast, Neal et al and Tanzer noted a variety of histologic changes such as increase in fibrous tissue and edema.^{13,14} Scelsi et al reported that recent-onset idiopathic carpal tunnel syndrome was characterized by thickened and edematous tenosynovium with inflammation and also noted that long standing disease was characterized by fibrosis associated with sclerohyalinosis and at times, amyloid deposition.⁵ Nakamichi and Tachibana reported a high incidence of normal tenosynovium.⁶⁻⁸

We evaluated the tenosynovium and carpal ligaments of 209 patients with idiopathic carpal tunnel syndrome. The important finding of the present study compared with those reports was the absence of inflammation in all of our cases. There were no typical or consistent histologic findings in idiopathic carpal tunnel syndrome. Considering the absence of inflammation, we believe that tenosynovitis does not appear to play a role in idiopathic carpal tunnel syndrome. However, additional studies are needed to address this issue.

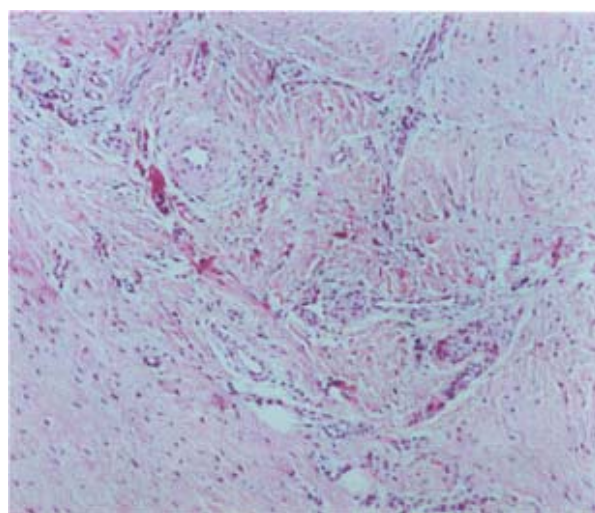


Figure 2. Histologic findings of the transverse carpal ligament in idiopathic carpal tunnel syndrome showing mild vascular proliferation (hematoxylin-eosin, x100).

Histologic Findings in Idiopathic Carpal Tunnel Syndrome

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