

Carpal Tunnel Release During Pregnancy: Report of Two Cases

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Abstract

Symptoms of carpal tunnel syndrome are common occurrences during pregnancy, particularly in the third trimester. Most patients undergo successful nonoperative treatment shortly after birth or the cessation of breast feeding. However, symptoms noted earlier during pregnancy are more likely to be severe and persistent. We present the cases of two women who developed symptoms of severe carpal tunnel syndrome during the second trimester and did not improve with nonoperative measures. Both underwent carpal tunnel release during pregnancy, with excellent postoperative result. Obstetric providers and surgeons alike should consider surgical treatment for patients with carpal tunnel syndrome who do not improve after nonoperative methods.

Introduction

Carpal tunnel syndrome has long been associated with pregnancy, with incidence reported as high as 62% among pregnant women.¹ There are several purported reasons for this high incidence, although the true cause remains unknown and is likely multifactorial. Blood volume can increase 30% to 50% with a single pregnancy, and various hormonal causes of increased fluid retention and hyperemia contribute to generalized edema, which is theorized to cause swelling within the carpal tunnel, leading to symptoms of median nerve compression.²

Symptoms of carpal tunnel syndrome often present in the third trimester and are believed to resolve shortly after childbirth.² However, symptoms can occur as early as the first trimester and progress more quickly than idiopathic carpal tunnel syndrome regardless of severity.³ Furthermore, up to 50% of cases persist after childbirth.⁴ Nonoperative management with splinting, injections, and supportive care is usually standard treatment before childbirth⁵; however, when these methods fail to provide adequate symptom relief, surgical release of the carpal tunnel should be considered.

We describe two women in their first pregnancy with symptoms of carpal tunnel syndrome that started during the second trimester and did not improve with nonoperative treatment. Both underwent carpal tunnel release during pregnancy. The patients were informed that the data concerning the case would be submitted for publication, and they provided verbal consent.

Case Reports

Case 1

A 35-year-old, right-hand dominant woman, employed as a registered nurse, was referred to our hand clinic with symptoms of bilateral hand pain and numbness. She was in the seventh month of pregnancy with her first child and had been having symptoms for 2 months. More symptoms were noted in her right hand than left. The numbness involved the thumb and index fingers and occasionally the ring finger. She had tried using night splints with minimal relief and routinely woke up with numbness and tingling in her hand. No history of diabetes or thyroid disorders was reported. She had no other notable medical history and never had symptoms of carpal tunnel syndrome.

At presentation, a body mass index (BMI, kg/m²) of 33.14 was recorded. Results of the Phalen and carpal-compression tests were positive for both hands. Two-point discrimination was 5 mm in all digits. No thenar atrophy or appreciable weakness of the abductor pollicis brevis was noted. The patient had full range of motion of the wrist and all digits. Clinically, a diagnosis of bilateral carpal tunnel syndrome was made.

The patient was subsequently referred for electrodiagnostic studies. Results of which showed a median-motor latency of 8.5 ms on the right hand and 5.9 ms on the left. Sensory latency in the median nerve was nonrecordable on the right and 3.6 ms on the left hand. Results of electromyography revealed positive sharp waves and increased insertional activity in the abductor pollicis brevis on the right hand. The patient was offered and underwent corticosteroid injection, which

did not improve her symptoms. After she returned from a visit with her obstetrician, open carpal tunnel release was performed, with short acting axillary regional block through a limited palmar incision. Intraoperative findings included a large palmaris brevis overlying the transverse carpal ligament, with aberrant sensory nerve branch and considerable hyperemia of the median nerve (Figure 1). At 2 weeks postoperatively, she had complete resolution of her symptoms. The patient elected to postpone operative treatment of the left hand until after childbirth.



Figure 1. Intraoperative photograph of the right hand in case 1, revealing severe hyperemia of the median nerve after complete release of the transverse carpal ligament.

Case 2

A 40-year-old, right-hand dominant woman presented during the eighteenth week of her first pregnancy, with symptoms of severe right-hand numbness, tingling, burning pain, and loss of dexterity. She was an intensive-care physician and had difficulty with work owing to the severity of symptoms. Comorbidities included type 2 diabetes mellitus, which worsened with pregnancy and required insulin; hypertension; depression; and antiphospholipid antibody syndrome. At presentation, the patient was taking labetalol, long and short acting insulin, metformin and lovenox. She did not smoke.

At presentation, a BMI of 33.9 was recorded. Examination results of the right hand showed 4-of-5 motor strength in the abductor pollicis muscle, decreased sensation to light touch in the median nerve distribution, and positive provocative maneuvers for carpal tunnel syndrome. She was subsequently referred for electrodiagnostic studies which revealed a right median motor distal latency of 4.4 ms and distal sensory latency of 3.3 ms. Results of electromyography showed reduced recruitment with increased amplitude and duration on volitional Motor Unit Action Potentials in the abductor pollicis brevis.

Her case was discussed with her obstetric provider, and the decision was made to proceed with operative intervention owing to the severity of her symptoms. No injections were performed. The patient underwent open carpal tunnel release to treat her right hand at 20 weeks' gestation. Intraoperatively, she was noted to have a very thickened transverse carpal ligament, with hyperemia and fibrosis of the median nerve. No operative or postoperative complications were noted. At 2 weeks postoperatively, her pain had resolved. Mild numbness was noted at the tip of her right index finger, which resolved at 6 weeks postoperatively. She developed symptoms of mild carpal tunnel syndrome on the left hand, which were treated successfully with bracing and did not require surgical intervention.

Discussion

The incidence of pregnancy-related carpal tunnel syndrome has varied reports, from 0.8% to 70% noted.⁶ The most common symptom is numbness, followed by pain.¹ In fact, patients with pregnancy-related carpal tunnel syndrome may have more severe symptoms than those with idiopathic carpal tunnel syndrome.⁴ Nocturnal symptoms are common, and involvement is often found in both hands.^{2,3} Results of electrodiagnostic studies can help determine severity of nerve compression and identify treatment methods. Patients with sensory and motor changes are more likely to undergo operative treatment.⁵

Potential reasons for the regular occurrence of pregnancy-related carpal tunnel syndrome include hypersensitivity of the nerve owing to pregnancy, which results in a double-crush phenomenon; generalized edema resulting from fluid retention and increased blood volume; tenosynovitis of the flexor tendons; and endocrine adaptations in glucose metabolism.² However, the true cause may be multifactorial and remains unclear. Patients with hand swelling that prevents use of rings have increased incidence of carpal tunnel syndrome.⁷ Yet the amount of weight gain during pregnancy has not been correlated with the development of symptoms.¹

In general, treatment has consisted of nonoperative measures during pregnancy because symptoms usually abate after delivery.² However, symptoms may not always resolve quickly after childbirth. At 3 years after child birth, up to 30% of women may have residual symptoms.⁶ Symptom resolution can be prolonged while breast feeding.⁵ Regardless, the number of cases involving operative treatment during pregnancy remains low. We reviewed all carpal tunnel release procedures performed at our institution from January 2014 to November 2016, during which 891 procedures were performed and only

two involved pregnant women (reported in the current study). Furthermore, about 82% of pregnant patients have successful relief of symptoms with use of nighttime splints.⁵ Use of corticosteroid injections is effective particularly when treating mild to moderate symptoms, without adverse effect on the fetus.²

The issue, therefore, is identifying patients who should be offered treatment with carpal tunnel release during pregnancy. Although nonoperative measures should be used first, not all women experience resolution of symptoms. Women who develop symptoms during the first and second trimesters of pregnancy have been described as less likely to improve after undergoing nonoperative treatment.^{2,5,8} The clinical practice guidelines of the American Academy of Orthopedic Surgeons do not offer specific recommendations for treating pregnancy-related carpal tunnel syndrome, except to suggest surgery if conservative treatment fail. Overall, a success rate of 98% has been reported with operative treatment in the general population.²

In case 1 of the current study, the cause of the symptoms was likely the ischemia of the nerve resulting from increased pressure in the carpal tunnel, owing to the notable amount of hyperemia and nerve swelling found after release of the transverse carpal ligament. Similarly, results of case 2 confirmed median nerve compression localized to the carpal tunnel, with changes in the abductor pollicis brevis muscle. Resolution of symptoms after carpal tunnel release was noted for both cases, and neither patient experienced pregnancy-related complications as a result of the surgery.

Furthermore, both women had a BMI of 33 at presentation, which may indicate the degree of weight gain or edema experienced during pregnancy. Unfortunately, BMI information was not available before pregnancy for either woman. Increased edema, although not necessarily increased weight gain, has been associated with increased incidence of carpal tunnel syndrome.^{5,8,9} Similarly, older women have been shown to have increased incidence of carpal tunnel syndrome during pregnancy, and both of our patients were classified as advanced-maternal ages at 35 and 40 years.⁷

Additionally, both patients had motor changes affecting the thenar musculature. This likely indicates the severity of nerve compression and may suggest the need for earlier operative intervention. Perhaps the most predictive indicator of operative intervention in both patients was the presence of symptoms in the second rather than third trimester of pregnancy.²

Results of further prospective studies would help determine the natural history of pregnancy-related carpal tunnel syndrome. Additionally, the findings may

illuminate which patients can be treated successfully with nonoperative or operative methods.

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Conflict of Interest

The authors report no conflicts of interest.

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