

SHORT COMMUNICATION

Pregnancy-related Hand and Wrist Problems

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Hand and wrist disorders are common during pregnancy. Most of these problems develop during the third trimester when hormonal changes, fluid retention, and weight gain are maximum. This review study aimed to discuss pregnancy-related hand and wrist problems, and provide an overview of their pathology, clinical presentations, clinical examinations, and treatment options. Pregnancy-related carpal tunnel syndrome and De Quervain disease are among the most encountered disorders; however, neuralgic amyotrophy, pyogenic granuloma in hand, ligamentous laxity of the joints, arthralgia, and exacerbation of hand and wrist arthritis are among other reported disorders during pregnancy. Pregnancy-related hand and wrist problems may remain undertreated and reduce pregnant females' quality of life. Non-surgical treatments are usually effective for pregnancy-related hand and wrist problems. In general, pregnancy-related hand and wrist problems have a good prognosis and usually resolve after childbirth.

Level of evidence: IV**Keywords:** Neuralgic amyotrophy, Pregnancy-related carpal tunnel syndrome, Pregnancy-related De Quervain disease, Pregnancy-related ligament laxity, Pyogenic granuloma**Introduction**

Hand and wrist problems are common complaints of pregnant females. Hormonal changes, fluid retention, and weight gain may exacerbate or precipitate hand and wrist problems during pregnancy. Patients may complain of specific and non-specific problems, which may decrease pregnant females' quality of life (1-3). Any treatment must take into account the risks to the well-being of the fetus, as well as the impact upon the symptoms of the mother (1).

In a descriptive study conducted by Kesikburun et al. 61 (33.2%) out of the 184 pregnant females complained of musculoskeletal pain in the hand and wrist in pregnancy. These problems were the third most common musculoskeletal complaints, after back and low back pains (2). Balik et al. studied the hand and wrist problems in 383 pregnant females at ≥ 28 weeks gestation and reported that there were 125 (32.6%) asymptomatic patients. In total, 67.4% of the pregnant females were suffering from hand and wrist problems. Moreover, there were 39 (10.2%), 80 (20.2%), and one (0.3%) patients with carpal tunnel syndrome, tendonitis, and cubital

tunnel syndrome, respectively. Moreover, 138 (32.6%) females had non-specific symptoms (3).

Pregnant patients with hand and wrist problems may be undertreated. This review aimed to describe the pregnancy-related hand and wrist problems and provide an overview of pathology, clinic presentations, clinical examinations, and treatment options of these conditions; however, it does not discuss autoimmune-related musculoskeletal disorders during pregnancy.

Pregnancy and nerve disorder of the hand and wrist**Carpal tunnel syndrome**

Carpal tunnel syndrome (CTS) is the second most common musculoskeletal problem during pregnancy after low back pain. Baumann et al. found that sensory conduction parameters of the median nerve in 69 pregnant females were abnormal compared to that in 40 non-pregnant females. Moreover, eight (11%) patients had electrophysiological median neuropathy, and four patients developed this condition later during pregnancy

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or after childbirth. The authors concluded that pregnancy had induced abnormal median nerve hypersensitivity and median nerve susceptibility to pressure (4).

The reported prevalence of CTS is higher in pregnancy, compared to its prevalence in the general population, and is widely various. The severity of symptoms and functional impairments of CTS in pregnant females are relatively mild compared to that in non-pregnant females; therefore, these conditions may be overlooked by healthcare providers and remain underdiagnosed and undertreated as a result (5). The prevalence of electrophysiological median neuropathy in pregnancy has been reported to be 7%-43%; however, 31%-62% of patients were reported to have self-reported CTS symptoms during pregnancy. The CTS in pregnancy is usually bilateral and mostly develops in the third trimester of pregnancy when body fluid retention and weight gain reach the maximum. The developed CTS in the first or second trimester usually aggravates in the third trimester (6).

The presenting symptoms of CTS during pregnancy are similar to those in non-pregnant patients. The pregnant patient describes numbness and paresthesia along with the distribution of the median nerve, wrist pain, night awakening, decreased two-point discrimination, as well as thenar muscle atrophy at the later stages (4, 7). Tinel's sign, Phalen's test, and Durkan's test may be positive. The electrophysiological criteria used for the diagnosis of median nerve neuropathy at the wrist in pregnant and non-pregnant females are similar (a sensory latency >3.5 ms and a motor latency >4.5 ms). However, it does not necessarily mean that a pregnant female needs to undergo an electrophysiological examination to confirm median nerve neuropathy at the wrist. Given the fact that surgery is not usually considered a treatment option during the pregnancy and that the symptoms usually resolve after parturition, an electrophysiological examination can be avoided (5, 7).

Pregnant females with CTS have statistically significantly higher levels of fluid retention, compared to pregnant females without CTS (5, 7-8). Patients with gestational hypertension and preeclampsia are more prone to developing CTS. Patients with a higher pregravid body mass index, a history of smoking and alcohol consumption, non-Caucasian ethnicity, alteration in glucose metabolism and diabetes, increased maternal age, tenosynovitis, and CTS symptoms during the previous pregnancies may have a greater risk of developing pregnancy-related CTS (4-10). Depression has not been proven to be a risk factor of CTS development during pregnancy (4).

Pregnancy-related CTS usually has a benign prognosis. The severity of pregnancy-related CTS symptoms usually resolves few weeks after childbirth, and is strongly correlated with loss of the weight gained during pregnancy; however, electrophysiological changes may take a longer time to return to normal limits (8). The repetitive hand movements required for nursing and caring a newborn, along with the residual fluid retention and hormonal changes, may delay complete relief of symptoms in some patients during the child-nursing period. In a systematic review study conducted

by Padua et al., >50% of the patients reported that the symptoms persisted even after one year of treatment, and approximately 30% of the patients still had the symptoms after three years (6).

Activity modification, edema control, and wrist splinting keep the wrist in a neutral position and provide symptomatic relief of pregnancy-related CTS. Steroid injection may provide temporary symptom relief in a majority of patients. Steroids can be used safely during pregnancy and lactation, provided they are not contraindicated due to other systemic disorders (5, 7). Surgery is seldom indicated; however, it may be considered when the symptoms and functional impairments are severe, nonsurgical treatments are ineffective, and significant nerve compression is detected in the electrophysiological study. Carpal tunnel surgery under local anesthesia is a safe procedure for the mother and fetus (5, 7-8). The Wide Awake Local Anesthesia No Tourniquet (WALANT) technique may be used in some cases for whom surgery is needed (11).

Neuralgic amyotrophy

Neuralgic amyotrophy (NA) or Parsonage-Turner syndrome (PTS) is characterized by acute severe pain around the shoulder and arm, followed by weakness, atrophy, and sensory impairment. A probable immune-mediated mechanism may trigger NA or PTS during the peripartum period (12).

The upper trunks of the brachial plexus, suprascapular nerve, long thoracic nerve, and axillary nerve are the most commonly involved nerves. The least commonly involved nerves are the anterior interosseous, musculocutaneous, spinal accessory, ulnar, radial, and median nerves. The NA may also involve the autonomous nervous system (12). Brussé and Burke reported a case of recurrent anterior interosseous nerve palsy in a patient during her three subsequent pregnancies (13).

The NA is a clinical diagnosis. Electromyography shows acute denervation with positive sharp waves and fibrillation potentials three to four weeks after the onset of symptoms when electromyography shows chronic denervation and with early reinnervation (polyphasic motor unit potentials). In the acute phase, oral corticosteroid therapy has positive effects on pain and may expedite recovery. Moreover, non-steroidal anti-inflammatory medications and opiates may be prescribed for pain relief. After resolution of the acute pain, physical therapy is recommended to address the residual symptoms (12).

Pregnancy and stenosing tenosynovitis in the hand and wrist

Fluid retention, edema, and repetitive forceful hand movements may cause stenosing tenosynovitis of the hand and wrist tendons. De Quervain disease or stenosing tenosynovitis of the first extensor compartment is the second most common hand and wrist problem during pregnancy and the postpartum period. Fluid retention during the third trimester of pregnancy and repetitive picking up of the baby in particular positions that are needed for nursing and care of the child predispose the

patient to De Quervain disease. De Quervain disease has a higher rate of bilateral involvement in pregnant females than in the general population. De Quervain disease is characterized by pain and tenderness over the radial styloid, thickened first extensor retinaculum, and a positive Finkelstein test (14-17).

Read et al. studied the histopathological appearances of post-partum de Quervain's disease on seven wrists. Histopathological examination of the tendon sheaths revealed that myxoid degeneration was responsible for the remarkable thickening observed in the sheath. In addition, characteristic intramural deposits of mucopolysaccharides were present, predominantly in the subsynovial region. However, acute or chronic inflammatory changes were not seen. These findings were similar to those described in patients with de Quervain's disease and unrelated to pregnancy or childbirth (14).

De Quervain disease of pregnancy and breastfeeding is a self-limiting condition and responds well to non-surgical treatments such as thumb splinting, non-steroidal anti-inflammatory medications, and corticosteroid injection into the first extensor compartment. The symptoms usually resolve spontaneously after the termination of breastfeeding (14-17). In a randomized prospective study that was conducted on the wrists (n=19) of 18 pregnant or breastfeeding females with De Quervain disease, it was decided that none of the patients required surgery, and all of them responded well to the non-surgical treatments. On rare occasions that the non-surgical treatments fail to resolve the symptoms within 4-6 months, surgical release of the first extensor compartment can be offered (15, 16).

Cosgrover et al. reported a case of postpartum stenosing tenosynovitis of flexor pollicis longus (FPL). The patient had pain along the flexor surface of the thumb. There was a palpable nodule proximal to the metacarpophalangeal joint of the thumb. On physical examination, the patient demonstrated occasional snapping during flexion and extension of the thumb's interphalangeal joint and was treated with a thumb spica splint and non-steroidal anti-inflammatory agents. After one month, the symptoms disappeared, and she had resumed full activity without limitation (17).

Pregnancy and pyogenic granuloma in the hand

A pyogenic granuloma or lobular capillary hemangioma is a benign vascular tumor. The relationship between pregnancy and estrogen levels and the development of a pyogenic granuloma has been reported. Estrogen regulates the vascular endothelial growth factor (VEGF), which is an angiogenic factor and a probable precursor of this lesion. On rare occasions, the lesion may appear in the hand. Rader et al. have reported five patients with a pyogenic granuloma that developed during the third trimester of pregnancy. They suggested the term *epulis gravidarum manum* for the pyogenic granuloma in the hand of pregnant females. Pyogenic granuloma is characterized by an exophytic, friable, red-to-yellow nodule that may grow, ulcerate, and bleed easily. After pregnancy, pyogenic granuloma regresses due to the absence of VEGF and decreased estrogen level. Thus, hormonal changes may facilitate the resolution of

pyogenic granuloma after parturition. Silver nitrate has been recommended to treat pyogenic granuloma. Its success rate has been reported to be 85% in patients who received treatment for an average of 3.5 weeks. In case pyogenic granuloma bleeds and interferes with activities of daily living of the pregnant females, it needs to be removed. Excision of the lesion is curative; therefore, excision after parturition is the best method to prevent recurrence (18, 19).

Pregnancy and ligamentous and joint laxity in the hand

Pregnancy-related hormones particularly relaxin induces generalized ligamentous and joint laxity. Ligamentous and joint laxity may cause-specific and non-specific hand and wrist problems. In a cohort study of 200 pregnant females, Lindgren and Kristiansson measured the passive abduction of the ring finger. They found that finger joint laxity is a reflection of the constitutional weakness of the connective tissue in pregnancy, and it persists after childbirth. In a multiple regression analysis, the passive abduction angle of the left ring finger in early pregnancy and the number of previous pregnancies were positively, significantly, and independently associated with the incidence of back pain in late pregnancy and during the postpartum period (20).

Calguneri et al. studied the changes in peripheral joint laxity occurring during pregnancy in 68 females using the finger hyper-extensometer to quantify laxity at the metacarpophalangeal joint of the index finger. There was a significant increase in joint laxity during the third trimester of pregnancy, compared to the postpartum readings from the same individuals. When primigravid and multigravida females were compared, a highly significant increase in laxity was found in females having their second baby (21).

Miller et al. reported a case of scaphoid subluxation because of scapholunate ligamentous laxity in a postpartum female who had complete resolution of scaphoid subluxation four months after stopping lactation (22).

Regarding the preponderance of carpometacarpal (CMC) joint arthritis in females, Wolf et al. studied the effect of relaxin on the anterior oblique ligament of the thumb. The authors found receptors for relaxin in the anterior oblique ligament that causes CMC joint laxity. They suggested that relaxin may play a role in ligamentous laxity and the development of CMC joint arthritis (23).

The symptoms of ligamentous and joint laxity in the hand of pregnant females may be alleviated with the use of a splint. Generally, the symptoms of joint laxity resolve spontaneously within 6 months after stopping lactation, and surgery is not required (22,23).

Pregnancy and small joint arthralgia and arthritis in the hand

Pregnancy may induce small joint arthralgia and exacerbation of arthritis in the hand similar to rheumatoid arthritis. Only one study was found describing these conditions in pregnant females (24). In a prospective study of 157 pregnant females with no history of

rheumatic diseases, 22 (14.0%) and 14 (8.9%) females had arthralgia and exacerbation of arthritis, respectively, in the small joints of hands. Arthralgia and arthritis developed during the third trimester of pregnancy in all patients except one. Rheumatoid factor and antinuclear antibody were negative in all patients with arthritis. The symptoms of arthralgia and arthritis of the small joints of the hand resolved spontaneously and immediately after delivery in all patients. The authors have concluded that it may be a different disease entity (24). Further studies on pregnant females are needed to evaluate the role of pregnancy in the development of small joint arthralgia and arthritis in the hand and the way it should be treated.

Summary

Hand and wrist problems may decrease pregnant female's quality of life. However, these conditions are benign, self-limited, and temporary with expected resolution following pregnancy.

Most hand and wrist problems develop during the third trimester of pregnancy, when the hormonal changes,

fluid retention, and weight gain reaches the maximum. Pregnancy-related CTS and De Quervain disease are the most encountered disorders; however, NA, pyogenic granuloma in the hand, ligamentous laxity of the joints, arthralgia, and exacerbation of arthritis in the hand and wrist have been reported as well. Non-surgical treatments are usually effective for pregnancy-related hand and wrist problems. In general, pregnancy-related hand and wrist problems have a good prognosis and usually resolve after childbirth. However, some problems may persist during the postpartum period.

Conflicts of interest: There is no conflict of interest of any kind in preparing of this study.

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