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Chapter 5

Pain Management for Pregnant Women in the Opioid Crisis Era

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Additional information is available at the end of the chapter

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Abstract

Acute and chronic pain management during pregnancy, after delivery and even during lactation are challenging even for experienced physicians. This chapter intends to cover pregnancy-induced physiological changes in relation to pain conditions. It also covers the most common pain disorders in pregnancy and provides a comprehensive summary of the pharmacological and non-pharmacological options for pain management in pregnancy. Additionally, pain management in context of opioid abuse will also be covered, as high prevalence of opioid prescription is linked to the very poor maternal and fetal outcomes. The possibility of maternal opioid abuse and fetal opioid withdrawal should be known to all physicians, given its rising trends. Multimodal protocols and opioid sparing strategies are highly essential for safe pain management during pregnancy and have been discussed. This chapter is intended to be a fast and detailed review for residents, pain fellows, and physicians who seek pain control in pregnant women.

Keywords: pain management during pregnancy, pregnancy related musculoskeletal pain, non-pharmacological pain management, opioid crisis, opioid use disorder, neonatal abstinence syndrome

1. Introduction

Pain during pregnancy is not necessarily limited to labor pain and includes musculoskeletal, urological, neuropathic, and psychosocial pain. This can pose a diagnostic and management challenges, especially in terms of medication selection. If left untreated, it can lead to anxiety,
depression, and even physical disability. Pain can persist postpartum with severe symptoms in 10% of patients and can sometimes last for more than 10 years after delivery [1]. There are multiple barriers to effective pain management in pregnancy. In addition to the complex and multifactorial nature of pain, there is a worldwide misconception that acute musculoskeletal pain during pregnancy is a normal physiological consequence that should be coped with. There is also fear of undesirable pharmacological effects of pain medicines on the fetus that prevent patients from pursuing treatment options.

Another challenge is the ongoing opioid crisis. Progressive increase in opioid prescription and lack of familiarity with non-pharmacological pain management or multimodal protocols have led to a sharp increase in opioid abuse, admission to rehabilitation facilities, and increased overall maternal and fetal morbidity and mortality [2].

2. Physiological changes in pregnancy affecting pain

Pain occurring in pregnancy could be a result of mechanical and/or biochemical changes arising from changing physiology. The average pregnant woman gains 10–18 kg of weight (an approximate of 20% increase from baseline), doubling the mechanical load on axial joints and ligaments [3, 4]. The core muscles responsible for core stabilization and balance are stressed as well. The gravid uterus stretches the abdominal muscles and pelvic floor muscles. There is an upward shift of the center of gravity leading to some compensatory hyperlordosis with stretching of lower back muscles, significant anterior pelvic tilt with rotation of the pelvis on the femur, and increased use of hip extensors and abductors. There is also more head flexion and drooping of the shoulders [5]. Enlarged breasts and malposition during breastfeeding could also lead to thoracic kyphosis.

Hormonally induced structural changes include increased ligament and joint laxity, decreased bone density and weaker collagen, all of which have been associated with back pain [6, 7]. The Relaxin hormone is secreted from the placental decidua and corpus luteum to increase the myometrium relaxation and cervical softening by altering the matrix metalloproteinase and glycosaminoglycan compositions [8]. While the correlation of Relaxin hormone level with pain has been inconsistent, it can contribute to joint and ligament laxity and symphysis pubis dilation [7]. There is fluid gain of 2–3 l, which are locally entrapped in legs and ankles which in addition to global water retention contributes to joint stress [9]. This further contributes to joint stress. Improper joint loading can persist in the postpartum period due to continued ligament laxity and core muscle weakness. The net effect is low back pain (LBP) and pelvic girdle pain (PGP).

3. Non-labor chronic pain

Acute and chronic pains are very common in pregnancy, with an incidence of at least 60% for LBP and 20% for PGP. Chronic non-labor pain is any subjective unpleasant sensory experience, both physically and emotionally, with actual tissue damage not relating to obstetric origin for more than 6 months. Some authors accept a 3-month timeframe if pure central neuromodulation has been documented [10]. Chronic pain has been associated with poor
academic achievement, increased job loss, disability, anxiety, depression, sexual dysfunction and reduction in relationship satisfaction. These collectively contribute to a lower quality of life (QOL) [11]. Chronic pain guidelines classify chronic pain into pain with a specifically identifiable pathology (such as infection or malignancy) for which there is specific treatment or pain with non-specific pathology. Non-specific pain could be somatic, visceral, neuropathic, psychosocial, or combined. *(Table 1)* summarizes the type of chronic pain in pregnant women.

<table>
<thead>
<tr>
<th>Somatic</th>
<th>Musculoskeletal</th>
<th>Pelvic floor dysfunction</th>
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<td>Spondylosis</td>
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<td>Myofascial syndrome—fibromyalgia</td>
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<td>Visceral</td>
<td>Gynecologic</td>
<td>Endometriosis (most common)</td>
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<td>Pelvic adhesive/congestion syndrome</td>
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<td><strong>Infections:</strong></td>
<td>Tuberculous salpingitis—chronic PID</td>
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<td>Urological</td>
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<td>Malignancy: Gynecologic malignancy</td>
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<td>Mechanical: Prolapse of pelvic contents</td>
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<td>Adnexal cysts—cervical stenosis</td>
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<td>Inflammatory bowel disease</td>
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<td>Diverticulitis—colitis—celiac sprue</td>
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<td>Neuropathic</td>
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<td><strong>Malignancy:</strong> Colon neoplasm</td>
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<td><strong>Functional:</strong> Irritable bowel syndrome</td>
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<td>• Prior or current physical or sexual abuse</td>
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<td>• Depression—somatization disorder</td>
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<td>• Substance abuse</td>
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*Table 1.* Chronic pain conditions in pregnant women.
3.1. Musculoskeletal pain

Musculoskeletal pain is any pain that originates from muscles, tendons, or ligaments. Back pain and pelvic pain are among the most common types of chronic musculoskeletal pain in pregnancy [5]. Other less common types are cervical, thoracic, rib, abdominal wall, and chest wall pain. Acute musculoskeletal pain directly after labor could be due to sacral stress fracture, coccydynia (from coccygeal fracture, dislocation, or contusion), perineal tear after traumatic vaginal delivery, or symphysis pubis pain (from contusion or symphysis separation).

3.1.1. Lower back pain

Lower back pain (LBP) is any pain occurring between the 12th rib and the gluteal fold. LBP commonly occurs at lumbar spine level L4-5 and is believed to be a combination of mechanical strains, muscles weakness, joint laxity, and connective tissue edema without any identifiable etiology on imaging studies [12]. Less common causes are myofascial pain, lumbar disc herniations, and true sciatica. Magnetic resonance studies did not show any difference in the incidence of asymptomatic disc bulge or herniation in pregnant women compared with non-pregnant women [12].

3.1.2. Pelvic girdle pain

Pelvic girdle pain (PGP) is any pain occurring between the posterior iliac crest and gluteal fold down to the symphysis pubis. Also called lumbopelvic pain, it is the second most common pregnancy-related musculoskeletal complaint after LBP; however, it is even more disabling. PGP is classified into four categories: unilateral sacroiliac syndrome, bilateral sacroiliac syndrome, symphysiolysis (separation of the pubis), and pelvic girdle syndrome (pain in all three pelvic joint regions, namely the two sacroiliac joints and the pubis). The sacroiliac joint (SIJ) is the most common source of pelvic girdle pain in pregnancy [20], followed by pelvic floor muscle dysfunction, which is prevalent in 50% of pregnant women with pelvic pain. MRI studies have reported the pregnancy-induced SIJ changes to be SIJ-bone marrow edema (BME), joint fluid accumulation, capsulitis, enthesitis, and subchondral sclerosis [13].

3.1.3. Risk for musculoskeletal pain

While mechanical strain can occur routinely in pregnancy, musculoskeletal pain development is not universal. Risk factors include multiparity, preexisting joint disorders, obesity, and depression. LBP progressively increases with each trimester; however, it has a favorable postpartum course as the pain resolves at least in 80% of patients. Unfortunately, 20% of patients still report pain up to 3 years after delivery. The underlying etiology, severity of the symptoms and degree of anatomical changes (such as exaggerated symphysis widening and pelvic asymmetry) determine the intrapartum and postpartum prognosis. Bone marrow distension and joint capsular edema usually resolve after delivery, but autoimmune-related joint conditions such as multiple sclerosis and rheumatoid arthritis usually flare up in the postpartum period after the cessation of pregnancy-induced autoimmune modulation [14, 15].
3.2. Management of musculoskeletal pain

3.2.1. History and physical examination

A comprehensive and structured history is the first step for pain management in any patient. This includes:

- Detailed nature of the pain (onset, course, duration, alleviating and aggravating factors, and radiation)
- Functional limitations, other persistent pain conditions
- History of other comorbidities (e.g., diabetes mellitus, autoimmune diseases)
- History of illicit drug abuse
- Social and family support, coping mechanisms
- Alarming neurological signs as urinary retention (with overflow incontinence), bladder or bowel incontinence, saddle anesthesia, loss of anal sphincter tone, major motor weakness in lower extremities, and fever
- Any suspicion of infection, fracture, or malignancy should be investigated, and tertiary neurosurgical referral is warranted urgently

The **general** examination starts with inspection of the skin, spine, and pelvic contour; palpation of surrounding muscles, SIJ, and facet joints for tenderness; and determination of gait pattern. In SIJ and facet joint arthropathy, there is localized tenderness over the affected joints with increased pain on axial rotation. Discogenic pain radiates to back of the thigh and worsens with the flexion of the spine.

**Special** physical tests for back pain are designed to provoke reproducible pain during the joint action with high specificity and sensitivity. Thus, they can be relied upon for preliminary diagnosis and follow up. These include active straight leg raise (ASLR) test for LBP and Patrick’s Faber test for PGP, pubic symphysis palpation and modified Trendelenburg’s test for symphysis pubis pain, posterior pelvic pain provocation (PPPP) test for posterior pelvic pain, and long dorsal sacroiliac ligament (LDL) palpation for SIJ pain. Physical examination can be helpful in identifying symptomatic herniated disc and its alarming signs. However, it is not very helpful to definitely locate the anatomic source of other non-discogenic pain even after imaging studies [16]. In general, a single physical test is less useful than combined tests for clinical decision, thus combined clusters of physical examinations are recommended for better test reliability [17].

3.2.2. Laboratory investigations for musculoskeletal pain

There are no recommendations for routine laboratory investigations for musculoskeletal pain unless there is suspicion of infection or malignancy. Consider CBC, ESR, and CRP in
suspected malignancy, or thyroid assay if hypothyroidism is suspected, and any blood inves-
tigations according to provisional diagnosis.

3.2.3. Radiological investigations for musculoskeletal pain

There are no recommendations for routine radiological scans in acute or chronic back pain withou-
t warning signs. The European guidelines for diagnosis and treatment of PGP recommends against routine imaging for musculoskeletal pain during pregnancy. No significant differences were found in short- or long-term pain outcomes or functional recovery outcomes between immediate imaging versus routine care in patients with LBP in the absence of warning signs [18]. Due to poor sensitivity in detecting the early degenerative stages of SIJ arthritis, computed tomography (CT) and conventional radiography are not recommended. MRI is more favorable as a diagnostic alternative as there is no exposure to radiation and it is more reliable in discrimi-
nating changes around joints and ligaments. MRI is recommended for LBP, PGP and SIJ pain only in case of traumatic injuries, tumor, ankylosing spondylitis, and alarming signs [19].

3.2.4. Treatment of musculoskeletal pain

Treatment of musculoskeletal pain should be in a structured, multimodal approach. This involves the combination of non-pharmacological and pharmacological options. Surgical intervention is only reserved for emergency situations (acute disc herniation and cauda equina syndrome).

Non-pharmacological modalities include physical exercise and other alternatives such as massage, acupuncture, relaxation techniques, and chiropractic care. Physical exercise helps strengthen muscles of the back, abdomen, and pelvic floor to maintain core stability and aug-
ment joint stabilization.

The first line pharmacological treatment for mild pain is a short course of analgesics such as acetaminophen. NSAIDs can be used for no more than 2 days at a time, and it is contraindi-
cated in the third trimester and preferably to be avoided in first trimester. Opioids should also be avoided throughout the pregnancy. In chronic pain studies, prolonged opioid use did not show any benefit in functional outcome or reduction of pain intensity [20]. Moreover, it can increase pain sensitivity in the long run. Most medical societies agree about the judicious use of opioid in chronic pain, as summarized in Table 2.

3.3. Migraine

The incidence of new-onset migraine during pregnancy is around 2–3%. However, it is more common for pregnant women to have a prior history of migraine. Fortunately, severity and frequency of migraine symptoms reduce by 43–86%, mostly during the first trimester. Sumatriptan is considered safe and is recommended by the European Federation of Neurological Societies as abortive migraine therapy [21]. It is considered non-teratogenic and, despite the theoretical vasoconstrictor effect, no vascular malformations were reported. However, it has been associated with uterine atony and peripartum hemorrhage [22]. Ergot derivatives are contraindicated during pregnancy and lactation due to their high teratogenic
risk, uterine vasoconstriction, low birth weight, preterm contractions and miscarriage, and even convulsions in breastfed infant [23]. Beta-blockers are the first line prophylactic option during lactation and are considered safe during pregnancy. Angiotensin-converting enzyme inhibitors are contraindicated because of their nephrotoxicity and prematurity risk [22]. Non-pharmacological options include relaxation techniques, acupuncture, biofeedback, and behavioral cognitive therapy. Acetaminophen is ideal as first add-on medication. If acetaminophen fails, sumatriptan or NSAIDs could be added to the regimen based on clinical assessment and potential risk to the fetus.

| Recommendation 1: | Optimization of non-opioid pharmacotherapy and non-pharmacological therapy before trial of opioids. |
| Recommendation 2: | In persistent problematic pain despite optimized non-opioid therapy, Opioid trial can be started if, 1. Chronic non-cancer pain 2. No current/past substance use 3. No active psychiatric disorders |
| Recommendation 3: | In Patients with current substance use disorder, Opioid is strongly not recommended. |
| Recommendation 4: | In Patients with current active psychiatric disorder, Optimization of psychiatric disorder is strongly recommended before Opioid trial. as long as 1. Optimal non-opioid, non-pharmacological therapy for chronic non-cancer pain has been achieved. |
| Recommendation 5: | In long term opioid for non-cancer chronic pain patients should be restricted to less 90 mg morphine equivalents daily rather than no upper limit or a higher limit on dosing. |
| Recommendation 6: | Starting opioid for non-cancer chronic pain patients should be restricted to less 50 mg morphine equivalents daily rather than no upper limit or a higher limit on dosing. |
| Recommendation 7: | Opioids rotation and tapering for current opioid users in case of 1. Persistent non-cancer pain or 2. Adverse events “Rotation is parallel with the goal of dose reduction” |
| Recommendation 8: | Tapering opioids to the lowest effective dose with the aim to discontinuation. |
| Recommendation 9: | Multidisciplinary team (MDT) program is highly recommended for patients using opioids and experiencing serious adverse events. “MDT is not limited to a primary care physician, a nurse, a pharmacist, a physical therapist, a chiropractor, a kinesiologist, an occupational therapist, an addiction specialist, a psychiatrist, and a psychologist” |

Table 2. Summary of the 2017 Canadian Guidelines for Opioids for Chronic Non-Cancer Pain.
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