



# Persistent post-partum pain after vaginal birth and cesarean section

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## Abstract

***Purpose of review:** Labor pain remains under evaluated and under managed while evidence is growing that post partum treatments strongly influence patients' outcome. The present review examines the recent developments in mechanisms underlying labor and delivery pain and questions current understanding of post-partum pain features observed in patients.*

***Recent findings:** Different strategies to approach acute labor pain have been developed. Chronic pain after labor and delivery has not been studied so extensively. Prevalence rates of chronic pain after cesarean section are between 6 and 18% and after vaginal delivery they are between 4 and 10%. Predictors for chronic pain after cesarean section and delivery are previous chronic pain, general anesthesia and higher post delivery pain. As labor pain is rated as one of the most serious kinds of acute pain we speculate that effective treatment of this pain with peripartum epidural analgesia could prevent the development of chronic pain.*

***Conclusion:** Treatment of acute pain during labor and delivery is necessary to prevent chronic pain. Effective perioperative block of nociceptive inputs from the wound as well as use of antihyperalgesic and analgesic drugs in combination seem the best way to control postoperative pain and specifically to prevent central sensitization. Future studies should focus on the long-term effects of different analgesic regimens on the development of chronic pain after labor and delivery.*

## INTRODUCTION

A painful labor is a universal fear experienced by pregnant women as they approach term. Pain should be considered one of these undesirable events because optimal pain management is mandatory for early rehabilitation after labor. In modern obstetrics, alleviation of labor pains by simple, safe and effective means is possible, but still remain under evaluated and poorly treated (1).

Recent surveys suggest that 80% of patients experience pain after surgery, 11% having severe pain, and that pain delays recovery in 24% of patients undergoing ambulatory surgery (2, 3). Furthermore, recognition is growing that peri-operative treatments have long-term consequences on patients' outcome and quality of life; specifically, unrelieved acute pain favors the occurrence of postoperative cognitive impairment (4), and chronic post surgical pain (5).

Peri-operative pain management is currently a challenging area in which anaesthesiologists should be involved and take responsibility (6). The present review examines recent developments in labor and delivery pain mechanisms and questions the current understanding of post partum pain features observed in patients.

### Acute pain during and after vaginal delivery

The amount of pain experienced during labor is the result of complex processing of multiple physiologic and psychosocial factors on a woman's individual interpretation of nociceptive labor stimuli (7). In the 1980s, Melzack *et al.* (8) determined that about 65–68% of primiparas and multiparas rated their labor pain as 'severe' or 'very severe'; moreover, 23% of primiparas and 11% of multiparas rated their pain as 'horrible'. Labor pain scores are found to be higher than average pain scores reported by patients with chronic low-back pain, pain in non-terminal cancer patients, arthritic pain and other forms of chronic and acute pain that are universally acknowledged to be severe (9).

Labor pain arises from contraction of the myometrium against the resistance of the cervix and perineum, progressive dilatation of the cervix and lower uterine segment, as well as stretching and compression of pelvic and perineal structures (10). Pain during the first stage of labor is mostly visceral pain resulting from uterine contractions and cervical dilatation. During this phase, T10-L1 dermatomes are involved. The visceral afferent fibers responsible for labor pain travel with sympathetic nerve fibers to the uterine and cervical plexuses, through the hypogastric and aortic plexuses, before entering the spinal cord with the T10-L1 nerve roots (10). The onset of perineal pain at the end of the first stage signals the beginning of fetal descent and the second stage of labor. Stretching and compression of pelvic and perineal structures intensifies the pain. Sensory innervation of the perineum is provided by the pudendal nerve (S2–4), so pain during the second stage of labor involves the T10-S4 dermatomes (10).

Pain is defined as 'an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage' by the International Association for the Study of Pain. Chronic pain is defined as pain that persists beyond the usual course of an acute disease or after a reasonable time for healing to occur. This period can vary from 2 to 6 months (11).

Klein *et al.* reported that both episiotomy and perineal laceration are strongly associated with the presence of perineal pain during the immediate postpartum period and at 3 months for 11% of women (12). Similarly, MacArthur *et al.* found that 36% of 96 women with episiotomy described their pain as distressing or worse on postpartum day 1 and 6 percent reported the same pain levels on postpartum day 7 (13). In the HOOP study, 7.3% of women reported pain at 3 months; however, validated pain scales were not used (14). The reported prevalence

of perineal pain, back pain and pelvic girdle pain that affects women's recovery from childbirth ranging from 5–43% for 6 months after delivery (15).

### Chronic pain and cesarean section

Cesarean section are usually performed through a Pfannenstiel or vertical skin incision and a transverse lower uterine segment incision. Depending on haemostasis, the uterine wound is closed in one or two layers of continuous absorbable suture, the peritoneum and muscles are left open and the fascia is closed with a running continuous suture of absorbable material. The skin is closed with non absorbable individual stitches that are removed on day five or six. The patients ambulate 8–10 h after cesarean section.

Surgical injury causes flare formation around the wound and results in two different types of hyperalgesia. Primary hyperalgesia occurs for both thermal and mechanical stimuli applied to damaged tissues close to the site of injury (16). The underlying mechanism involves peripheral sensitization of primary afferent nociceptors by algogenic mediators locally released. Although inflammation certainly participates in incisional pain, its cause and its role are different from these in other models of tissular injury (17). In contrast, ischemia may play an important role and local acidosis parallels postoperative pain behaviors and hyperalgesia (18). Low pH activates several ion channels susceptible to transduce pain, i.e. acid-sensing ion channels, vanilloid receptors, purinergic receptors, and potassium channels. Surgical injury also induces hypersensitivity in adjacent tissues, called secondary hyperalgesia and observed only for mechanical stimuli applied to uninjured tissues surrounding the wound (16). Secondary mechanical hyperalgesia is considered a consequence of central sensitization and results from enhanced response of dorsal horn neurons to peripheral inputs, with magnitude and duration related to the degree of tissue injury (19).

Post-cesarean patients differ from the general surgical population because of concerns of exposure to analgesic drugs to the newborns and because of a need for early physical request to care for their baby. Pain treatment after childbirth may even be less adequate than after surgery. This is because of the restraint to use non-steroidal anti-inflammatory drugs or adequate doses of opioids during breastfeeding (20).

Persistent pain after cesarean section has been investigated in the Danish study by Nikolajsen *et al.* (21). They reported that 12.3% of the parturients experience persistent pain at the end of a follow-up period ranging from 6 to 18 months. Daily pain was reported in 5.9% of the patients. In that study, the risk factors for persistent pain were cesarean section under general anaesthesia, as well as previous pains problems, and recall of severe acute postoperative pain (21).

The type of anaesthesia was found to be a predictor of chronic pain, showing that patients undergoing cesarean

section under general anaesthesia had a higher frequency of pain than patients receiving spinal anaesthesia (21).

Almeida *et al.* (22) found that 67% of women with chronic pelvic pain had a history of cesarean section. In an Asian study, the incidence of chronic pain after 3 months was 9.2% after elective cesarean section under spinal anaesthesia. Higher recalled pain scores postoperatively, the presence of pain elsewhere and non-private insurance status were found to be independent risk factors (23).

A study from Finland found a significant difference in persistent pain 1 year after delivery between cesarean section (44/229, 18%) and vaginal delivery (20/209, 10%). The persistent pain was mild in 55% of the women in both groups, and intense or unbearable in four women after cesarean sections and in six women after vaginal births. Persistent pain was significantly more common in women with previous pain, previous back pain and any chronic disease. The women with persistent pain recalled significantly more pain on the day after cesarean section and vaginal birth than those who did not report persistent pain (24).

Eisenach *et al.* (25) recently compared the occurrence of chronic pain after cesarean section and after vaginal delivery. The prevalence of severe acute pain within 36 h postpartum was found to be 10.9% and persistent pain after 8 weeks was found to be 9.8%. Severity of acute postpartum pain was independently related to the risk of persistent postpartum pain, whereas no relation was observed concerning mode of delivery. Women with severe acute postpartum pain had a 2.5-fold increased risk of persistent pain.

The few presented studies agree that drug combinations – multimodal or balanced analgesia – are mandatory to achieve satisfactory and effective pain relief with reduced side effects. Effective perioperative block of nociceptive input from the wound by means of regional anaesthesia and the administration of analgesic drugs may prevent central sensitization and reduce development of chronic pain.

## CONCLUSION

We conclude that persistent pain is more common after cesarean section than vaginal birth, although the pain was usually mild. In all studies the persistent pain was associated with a history of previous pain, chronic disease and pain in the peri-partum time. A more extensive prospective study is needed to examine risk factors for persistent pain after cesarean section and vaginal delivery.

## REFERENCES

- KEHLET H 2005 Postoperative opioid sparing to hasten recovery: what are the issues? *Anesthesiology* 102: 1083–1085
- APFELBAUM J L, CHEN C, MEHTA S S, GAN T J 2003 Postoperative pain experience: results from a national survey suggest postoperative pain continues to be under managed. *Anesthesia & Analgesia* 97: 534–540
- PAVLIN D J, CHEN C, PENALOZA D *et al.* 2002 Pain as a factor complicating recovery and discharge after ambulatory surgery. *Anesthesia & Analgesia* 95: 627–634
- VAURIO L E, SANDS L P, WANG Y *et al.* 2006 Postoperative delirium: the importance of pain and pain management. *Anesthesia & Analgesia* 102: 1267–1273
- PERKINS F M, KEHLET H 2000 Chronic pain as an outcome of surgery: a review of predictive factors. *Anesthesiology* 93: 1123–1133
- GOTTSCHALK A, RAJA S N 2004 Severing the link between acute and chronic pain: the anesthesiologist's role in preventive medicine. *Anesthesiology* 101: 1063–1065
- LOWE N K 2002 The nature of labor pain. *American Journal of Obstetric Gynecology* 186: S16–S24
- MELZACK R, KINCH R A, DOBKIN P *et al.* 1984 Severity of labor pain: influence of physical as well as psychologic variables. *Canadian Medical Association Journal* 130: 579–584
- MELZACK R 1984 The myth of painless childbirth (the John J. Bonica lecture) *Pain* 19: 321–337
- McMAHON S, KOLTZENBURG M 2006 Wall and Melzack's textbook of pain. 5th ed. Elsevier/Churchill Livingstone, Philadelphia, p 794–795
- MERSKEY H, BOGDUK N 1994 Classification of chronic pain: description of chronic pain syndromes and definitions of pain terms. IASP Press, Seattle.
- KLEIN M C, GAUTHIER R J, ROBBINS J M *et al.* 1994 Relationship of episiotomy to perineal trauma and morbidity, sexual dysfunction, and pelvic floor relaxation. *American Journal of Obstetric Gynecology* 171: 591–598
- MACARTHUR A J, MACARTHUR C 2004 Incidence, severity, and determinants of perineal pain after vaginal delivery: A prospective cohort study. *American Journal of Obstetric Gynecology* 191: 1199–1204
- ALBERS L, GARCIA J, RENFREW M *et al.* 1999 Distribution of genital tract trauma in childbirth and related postnatal pain. *Birth* 26: 11–17
- WANG S M, DEZINNO P, MARANETS I *et al.* 2004 Low back pain during pregnancy: prevalence, risk factors, and outcomes. *Obstetric Gynecology* 104: 65–70
- ZAHN P K, BRENNAN T J 1999 Primary and secondary hyperalgesia in a rat model for human postoperative pain. *Anesthesiology* 90: 863–872
- LEONARD P A, ARUNKUMAR R, BRENNAN T J 2004 Bradykinin antagonists have no analgesic effect on incisional pain. *Anesthesia & Analgesia* 99: 1166–1172
- WOO Y C, PARK S S, SUBIETA A R, BRENNAN T J 2004 Changes in tissue pH and temperature after incision indicate acidosis may contribute to postoperative pain. *Anesthesiology* 101: 468–475
- POGATZKI E M, NIEMEIER J S, BRENNAN T J 2002 Persistent secondary hyperalgesia after gastrocnemius incision in the rat. *European Journal of Pain* 6: 295–305
- LAVAND'HOMME P 2006 Postcesarean analgesia: effective strategies and association with chronic pain. *Current Opinion in Anaesthesiology* 19: 244–248
- NIKOLAISEN L, SORENSEN H C, JENSEN T S, KEHLET H 2004 Chronic pain following caesarean section. *Acta Anaesthesiologica Scandinavica* 48: 111–116
- ALMEIDA E C S, NOGUEIRA F J, CANDIDO DOS REIS F J, ROSA DE SILVA J C 2002 Cesarean section as a cause of chronic pelvic pain. *International Journal of Gynaecology & Obstetrics* 79: 101–104
- SONG B L, SIA A T H, QUEK K *et al.* 2009 Incidence and risk factors for chronic pain after caesarean section under spinal anaesthesia. *Anaesthesia Intensive Care* 37: 748–752
- KAINU J P, SARVELA J, TIIPPANA E *et al.* 2010 Persistent pain after caesarean section and vaginal birth: a cohort study. *Int J Obstet Anesth* 19: 4–9
- EISENACH J C, PAN P H, SMILEY R *et al.* 2008 Severity of acute pain after childbirth, but not type of delivery, predicts persistent pain and postpartum depression. *Pain* 140: 87–94