Pre-Operative Scar Hyperalgesia in Women Undergoing Repeat Cesarean Section

Abstract Type: Original Research
Clemens M. Ortnert, M.D.1; Jake Kraft, M.S.1; Philippe Richebe, M.D.1; Laurent A. Bollag, M.D.1; Michal Granot, Ph.D.2; Ruth Landau, M.D.1
University of Washington1; University of Haifa2

Introduction: In the US, 1.2 Mio cesarean sections (CS) are performed annually out of which 30% are elective repeat CS (1). Acute post-CS pain and wound hyperalgesia remain an under-recognized problem that may result in chronic post-surgical pain (2). Repeat CS represents a unique pain model as few surgical procedures are actually repeated following the same exact incision and surgical protocol. To the best of our knowledge, scar mapping to assess pre-op hyperalgesia has not been evaluated in this constantly growing surgical population. We hypothesized that a substantial proportion of women have abnormal scar mapping prior to their repeat CS, and that this otherwise unsuspected scar hyperalgesia may be associated with increased post-CS pain.

Methods: 165 women scheduled for repeat CS were enrolled in the study. Recall of persistent pain at previous CS was assessed. Mechanical temporal summation (mTS) & scar mapping to evaluate hyperalgesia (Fig) were tested pre-op. Spinal anesthesia was standardized (bupivacaine 12mg, fentanyl 25µg & morphine 100µg). Post-op pain scores (12, 24, 48h) and wound hyperalgesia at 48h were recorded. Statistical analysis included t-test for equality of means and Pearson correlation (p<0.05).

Results: Recall of persistent pain at previous CS was present in 13 women (8%). Pre-op scar hyperalgesia was found in 67 women (40%) with a median hyperalgesia index (HI)=0.42 (Q25=0.25;Q75=1.1, range 0.03-4.25). Women with pre-op hyperalgesia had higher pain scores at 12, 24 and 48h post-CS (Fig) and HI was correlated with pain severity (r=0.29, p<0.001), 48h post-op hyperalgesia (r=0.594, p<0.001) and pre-op mTS (r=0.164, p< 0.05).

Conclusion: We report a rather high incidence of pre-op scar hyperalgesia in women scheduled for repeat CS. In addition, pre-op hyperalgesia was associated with abnormal pre-op mTS, higher post-op pain scores and post-op wound hyperalgesia. The combination of several quantitative sensory tests that all substantiate central sensitization (hyperexcitation) suggests abnormal pain modulation in these women. Pre-op wound mapping may allow predict women at higher risk for severe acute and possibly persistent pain that would justify anti-hyperalgesic drugs in addition to standard multimodal analgesia. Such an approach has already been suggested; intra-op iv ketamine was most effective in women with abnormal pre-op temporal summation (3).

1 Zhang, AJOG 2010
2 Lavandhomme, IJOA 2010
3 Lavand'homme, SOAP 2009 (A258)
**Scar mapping technique**

Stimulation with 180g von Frey filament starts from outside the scar and moved in ±0.5 inch increments toward the scar every inch until a painful, sore, or sharp sensation is reported. The distance to the incision is measured. If no change in sensation occurs, stimulation is stopped 0.3 inch from the incision.

The Hyperalgesia Index (HI) is calculated as:

\[ HI = \frac{\sum \text{distances to scar from point of hyperalgesia}}{\text{length of incision}} \]


Figure: Pre-operative scar mapping and acute post-CS pain scores