

Modeling the Time Course of Labour Pain & Progress

Pamela Flood, Columbia University, New York, NY, USA

Labor is one of the most painful experiences most women will have in their lifetime. However, the pain experienced in labor is dynamic, ranging from mild to severe in early labor and progressing to moderate to severe by the end of the first stage of labor. We have developed mathematical models for labor pain and labor progress in order to evaluate demographic and treatment differences between patients and to determine which factors predispose to a more rapid and less painful labor (1,2). Similarly, treatment of labor pain can not be considered a “one size fits all” endeavor. While epidural analgesia is highly effective in all groups studied, it is invasive, resource intensive and not available in all centers globally. We found that nulliparous women treated with oxytocin report more pain in early labor. Asian women report less pain and patients having slower labor progress report less pain regardless of ethnicity.

Models of labor progress were developed in the 1960’s by Friedman. These population models allowed for the development of normograms to determine whether labor was progressing normally or whether a cesarean section is indicated. Clearly, it is critical that labor occur at the right time in gestation and not progress too fast as to result in an extramural delivery nor too slow as to add risk for infection and require surgical delivery. We developed a biexponential model that describes the first phase of labor progress in nulliparous patients that can be extended to individual treatment. Our model predicts that Asian patients and heavier patients have significantly slower labor progress (2).

With these demographic and treatment variables identified, we have embarked on an evaluation of genetic characteristics that influence labor pain and progress. Preliminary analysis suggests that a common polymorphism in the B2AR gene that affects contractility of smooth muscle (including uterine muscle) is predictive of faster labor. We have also identified a common polymorphism in the m-opioid receptor gene that is predictive of severe pain beginning in early labor.

1. [Anesth Analg](#). 2008 106:593-8
2. *Anesthesiology* 2009 111: 1093-1110