Defining and Managing Normal and Abnormal Second Stage of Labor

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KEYWORDS

• Second stage of labor • Length of labor • Epidural • Cesarean

KEY POINTS

- The norms of the length of the second stage are based on outdated information and appear to be longer than previously thought.
- Interventions in the second stage, such as operative vaginal delivery and cesarean delivery, have unclear benefit and would benefit from carefully designed prospective studies.
- The association between prolonged second stage of labor and neonatal outcomes is not consistent in the literature.
- The association between prolonged second stage of labor and maternal outcomes may be due, in part, to the increased interventions with operative vaginal and cesarean delivery.

INTRODUCTION

Management of the second stage of labor is commonly based on its length such that when second stage exceeds a specific time threshold, women are often counseled and offered potential interventions, including operative vaginal delivery or cesarean delivery due to a "prolonged second stage." In this article, the authors review the basis for defining normal and abnormal length of second stage and discuss the impact of epidural analgesia on the second stage of labor and management of second stage with associated maternal and neonatal outcomes.

Disclosure Statement: The authors have no financial relationship with a company that has any relationship with the content of the article.

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Obstet Gynecol Clin N Am 44 (2017) 547–566

http://dx.doi.org/10.1016/j.ogc.2017.08.009

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DEFINING NORMAL AND ABNORMAL LENGTH OF SECOND STAGE

The length of the second stage of labor is defined as the duration between complete cervical dilation and delivery of the fetus. Labor and delivery practice during the past half century have been based primarily on the work of Dr Emmanuel Friedman in the 1950s.[1,2] The American College of Obstetricians and Gynecologists (ACOG) Practice Bulletin No. 49 on Dystocia and Augmentation of Labor states that the mean durations of the second stage in nulliparous and multiparous women are 54 and 19 minutes, respectively,[3,4] and notes that the use of epidural analgesia increases these means by 25 minutes.[5] According to this ACOG Practice Bulletin, a prolonged second stage is defined as more than 2 hours without epidural or 3 hours with epidural analgesia in nulliparous women, and 1 hour without, or 2 hours with epidural analgesia for multiparous women.[3]

This definition of normal and abnormal length of the second stage is primarily based on Friedman's studies of 500 nulliparous[1] and 500 multiparous parturients,[2] using the 95th centile lengths of the second stage as the thresholds while incorporating expert opinions in attempt to prevent maternal and neonatal morbidity and mortality.[1–3,6,7] The additional hour allotted for labor with epidural anesthesia appears to be based on the mean effect of epidural.[8,9]

Recognizing that contemporary obstetric population and practice have evolved, a large, multicentered, prospective cohort study (Consortium of Safe Labor) was conducted between 2002 and 2008 to examine labor characteristics of women with spontaneous labor and normal neonatal outcomes in the United States.[10] This study included 43,810 nulliparous and 59,605 multiparous singleton deliveries at 36 weeks' gestation or greater in vertex presentation who reached second stage from 12 clinical centers with 19 hospitals.[10] In this study, the prevalence of prolonged second stage, as defined by the ACOG's guidelines,[3] occurred in 9.9% of nulliparous women with epidural and 13.9% of nulliparous women without epidural in labor.[11] For multiparous women, prolonged second stage was diagnosed in 3.1% with and 3.5% without an epidural in labor, respectively.[11] Such prevalence of prolonged second stage was similar to a large population-based study (n = 193,823) from Nova Scotia that spanned 19 years (1988–2006).[12] In this study, 14.8% of nulliparous and 3.2% of multiparous women were identified as having a second stage of labor longer than 3 hours, or 2 hours, respectively.[12] Furthermore, the annual incidence rates of prolonged second stage in nulliparous women increased from 10.2% to 16.6% during the study period.[12] These large studies demonstrate that the current definition of normal/abnormal second stage identifies a relatively high proportion (~15%) of the contemporary obstetric population as having a prolonged second stage. As such, it is of vital importance to ascertain the benefits and risks associated with the current definitions of normal and abnormal second stage and the management thereof.

FACTORS INFLUENCING LENGTH OF SECOND STAGE

Maternal and Obstetric Characteristics

Many clinical factors can influence the progress of the second stage of labor. These factors include maternal characteristics, such as age, parity, the size and shape of the pelvis, height and weight, uterine contractile forces, soft tissue resistance, expulsion effort, as well as presence of medical/obstetric conditions, including hypertensive disorders or pregestational/gestational diabetes mellitus. Fetal characteristics include birth weight, fetal occiput position/degree of flexion, and station at complete cervical dilation.[11,13–17] Interestingly, the duration of the second stage of labor in women who had induction of labor were similar to that of women who had spontaneous labor.[18]