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CLINICAL ARTICLE

Drape estimation vs. visual assessment for estimating postpartum hemorrhage

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Abstract

Objective: To compare (1) visual estimation of postpartum blood loss with estimation using a specifically designed blood collection drape and (2) the drape estimate with a measurement of blood loss by photospectrometry. *Methods*: A randomized controlled study was performed with 123 women delivered at the District Hospital, Belgaum, India. The women were randomized to visual or drape estimation of blood loss. A subsample of 10 drape estimates was compared with photospectrometry results. *Results*: The visual estimate of blood loss was 33% less than the drape estimate. The interclass correlation of the drape estimate to photospectrometry measurement was 0.92. *Conclusion*: Drape estimation of blood loss is more accurate than visual estimation and may have particular utility in the developing world. Prompt detection of postpartum hemorrhage may reduce maternal morbidity and mortality in low-resource settings.

1. Introduction

Postpartum hemorrhage (PPH) is the leading cause of maternal mortality worldwide. It accounts for

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25% of maternal deaths, and most of these deaths occur in rural areas of developing countries [1]. The risk of PPH is increased in the absence of prompt and appropriate care, which includes the active management of the third stage of labor (gentle umbilical cord traction, uterine massage, and use of uterotonics), as well as fluid infusion, blood transfusion, and surgical intervention.

Maternal mortality rates in rural India are estimated to be 350 to 650 per 100,000 live births, accounting for the world's highest number of maternal deaths per year [1]. Postpartum hemorrhage, often preceded by antepartum anemia, is the primary cause of maternal morbidity and mortality in India. In spite of national preventive efforts to administer supplemental iron during the antepartum period, hemorrhage, in conjunction with anemia, still accounts for approximately 25—30% of these maternal deaths [2]. Most deliveries occur at home or at rudimentary health facilities, where many proven therapeutic interventions are not available. Inaccurate blood loss estimates often delay recognition of PPH and active intervention at these low-resource settings.

The current worldwide standard practice of postpartum blood loss assessment is visual estimation. A minimally trained health care provider generally observes blood lost during delivery and makes a quantitative or semiquantitative estimate. This approach has been shown for decades to be inaccurate, visual estimates being up to 50% less than actual values for blood lost in controlled studies [3,4,5].

Methods to quantify postpartum vaginal blood loss include visual estimation, direct collection, venous blood sampling, dye dilution techniques for plasma volume measurement, and red blood cell and plasma volume determinations using radioactive tracer elements [3,4,5,6,7,8,9,10,11]. The most accurate measures include venous blood sampling for determination of hemoglobin concentration, with and without assessment of blood volume by red blood cell labeling or spectrometry [3]. However, the most accurate methods have not been widely adopted because they are neither practical nor affordable in most clinical settings [7].

A blood collection drape (Fig. 1) was specially designed to assist in estimating postpartum blood loss in low-resource settings. It consists of a funneled and calibrated collecting pouch attached to a plastic sheet that is placed under the woman's buttocks immediately after delivery. Two belts attached to the upper end of the drape are tied around the woman's abdomen to optimize blood collection, particularly for deliveries performed on the floor or other flat surface. Calibration levels indicate the volume of blood collected by the drape.

Figure 1 The BRASS-V Drape, a specially designed blood collection drape with a calibrated collection pouch.

This collection drape has the potential to provide an objective measurement of postpartum blood loss and allows for a more accurately diagnosis of PPH than does visual assessment [12,13]. The present pilot study was conducted to compare (1) visual estimates of blood loss to drape estimates and (2) drape estimates to the "gold standard" of photospectrometry.

2. Materials and methods

A randomized, controlled, hospital-based trial was conducted from September through December 2003 with 123 women undergoing vaginal delivery at the District Hospital in Belgaum, Karnataka, India—a hospital affiliated with Jawaharlal Nehru Medical College. The internal review board approved the study.

All eligible women were approached when they were admitted to the labor and delivery ward, and all consented to participate in the study. The house officer or attending physician on duty determined eligibility using the following inclusion criteria: (1) the woman was scheduled for vaginal delivery; (2) she was able to give written or verbal consent to participating in the study; and (3) she had no