

THE USE OF OCCLUSIVE BALLOONS IN THE MANAGEMENT OF ABNORMAL PLACENTATION

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BACKGROUND

Although it is expected that bilateral internal iliac artery (IIA) or common iliac artery (CIA) occlusive balloons reduce blood flow to the uterine artery, the extensive collateral circulation from the cervical, ovarian, rectal, femoral, lumbar and sacral arteries can contribute to continued blood loss in patients with abnormal placentation [1]. The purpose of this study was to evaluate the outcome of women with abnormal placentation who delivered with or without the use of occlusive intra-arterial balloons.

METHODS

After Institutional Review Board approval, a retrospective chart review was conducted to evaluate the efficacy of preoperatively-placed occlusive balloons in cases with abnormal placentation from 2003-2014 in a single center (Tampa General Hospital). Occlusive balloons were placed preoperatively in the radiology suite or hybrid surgical room (Fig. 1) and were inflated at the discretion of the obstetrician and anesthesiologist with the onset of uncontrollable operative hemorrhage. The main study outcome was estimated blood loss. Secondary outcomes included transfusion requirements, total procedure time, length of intensive care unit (ICU) and hospital stay. Descriptive statistics were calculated for all continuous and discrete variables. The Kolmogorov-Smirnov test was used to assess the normality of distribution of investigated parameters for use in other analyses. Continuous data were expressed as means \pm standard deviations and compared using two-tailed independent Students t-tests. Categorical variables were compared using two-tailed independent Mann-Whitney U tests. $P < 0.05$ was considered significant. Data were analyzed using IBM SPSS 21.0 statistical software (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY).

RESULTS

A total of 42 cases of abnormal placentation were found during our study timeframe; 14 cases had balloon occlusion while 28 cases had conventional cesarean delivery (control). Nine of the 28 patients in the control group had occlusive balloons placed preoperatively but the balloons were not inflated during surgery due to lack of uncontrolled bleeding. Overall, there were 25 cases of placenta accreta, 9 cases of placenta percreta and 8 cases of placenta increta. There were no significant differences in baseline demographics and comorbidities. The occlusive balloons were placed in the CIA in 3 cases and in the IIA in 11 cases in the balloon occlusion group. No significant differences were noted between the control group and the group of patients that had inflated balloon occlusion (Table 1) in regards to estimated blood loss (3.7 versus 4.3 L, $P=0.767$), packed red blood cells transfused (7.2 versus 8.2, $P=0.799$), amount of crystalloids infused (5.5 versus 4.3 L, $P=0.435$), total procedure duration (242 versus 279 minutes, $P=0.076$), length of ICU stay (2 versus 4.3 days, $P=0.315$) or total hospital stay (8,3 versus 11.2 days, $P=0.254$) respectively. One of the fourteen patients who had balloons placed, experienced a catheter-related complication, a groin hematoma.



Fig 1. Hybrid room with C-arm installed for fluorography.

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Table 1: Perioperative Data

	Control (n=28)	Occlusive Balloon (n=14)	P-Value
Length of Hospital Stay (days)	8.4 \pm 6.9	11.21 \pm 8.5	0.3
Length of ICU stay (days)	2.1 \pm 1.9	3.4 \pm 5.02	0.3
Procedure time (mins)	242.4 \pm 90.3	297.1 \pm 94.7	0.07
Estimated Blood Loss (L)	3.7 \pm 5.7	4.3 \pm 7.0	0.8
RBC Transfused (units)	7.2 \pm 11.9	8.2 \pm 11.3	0.8
Crystalloids Infused (L)	5.5 \pm 5.8	5.5 \pm 5.8	0.4
Preoperative Hgb	10.7 \pm 1.2	11.4 \pm 1.3	0.07
Postoperative Hgb	9.9 \pm 2.2	10.5 \pm 1.9	0.4

Data are presented as mean \pm SD. ICU- intensive care unit, RBC= red blood cells, Hgb=hemoglobin

CONCLUSION

All of our high risk patients survived with minor complications. Although there were no significant differences in the outcomes studied between the control and occlusive balloon group, this technique may provide additional safety for an unexpected major intraoperative bleed.

REFERENCES

1. Shrivastava et al. Case-control comparison of cesarean hysterectomy. Am J Obstet Gynecol. 2007