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Taiwanese Journal of Obstetrics & Gynecology 50 (2011) 515–517

www.tjog-online.com

Case Report

Impact of anesthetic methods on neonatal outcome in women receiving temporary balloon occlusion of the common iliac artery during cesarean section for placenta accreta

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Accepted 18 November 2010

Abstract

Objective: Placenta accreta is associated with significant maternal morbidity and is the leading indication for peripartum hysterectomy. In our institution, occlusion balloon catheters are commonly placed in bilateral common iliac arteries in order to reduce blood loss and facilitate surgery in patients with this obstetric complication. Few studies, however, have evaluated the effect of different anesthetic methods for cesarean hysterectomy on neonatal outcome. In this study, we compared Apgar scores among neonates born to mothers under general anesthesia with those who received regional anesthesia.

Case Reports: A retrospective analysis of 19 women with placenta accreta/percreta who underwent cesarean hysterectomy in our hospital, revealed that the 1-minute Apgar score was <7 in 4/12 neonates born to women who underwent general anesthesia and in 1/7 neonates born to mothers who received regional anesthesia. The 5-minute Apgar score was >7 after immediate resuscitation in all neonates. There were no significant differences in demographic data, induction-to-delivery period, or Apgar scores between the general and the regional anesthesia groups.

Conclusion: We acknowledge that the retrospective nature of this study makes it difficult to conclude whether the different anesthesia management strategies had an impact on Apgar score; however, according to our clinical observation, regional anesthesia may be a better alternative in the induction-to-delivery period, especially for women with accreta/percreta and in situations in which poor neonatal outcome is expected.

Keywords: Anesthesia; Apgar score; Balloon catheters; Common iliac artery; Placenta accreta/percreta

Introduction

Placenta accreta, increta, and percreta are associated with significant maternal morbidity and mortality from catastrophic hemorrhage and are the leading indications for peripartum hysterectomy [1]. Preoperative sonographic detection of this pathologic condition warrants the immediate assembly of a multidisciplinary team of specialists to deal with potential massive hemorrhage [2]. Obstetricians in our institution attempt to reduce blood loss and facilitate surgery in pregnant women with a diagnosis of placenta accreta/percreta by placing an occlusion balloon catheter in the common iliac artery during the preoperative period [3]. Although anesthetic management of these patients is usually limited to general anesthesia, because of significant intraoperative blood loss and coagulopathy, regional anesthesia might be an appropriate choice for some patients [4]. Few studies, however, have evaluated the effect of different anesthetic methods for cesarean hysterectomy on neonatal outcome. In this study, we

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1028-4559/$ - see front matter
doi:10.1016/j.tjog.2011.10.021

compared Apgar scores among neonates born to mothers under general anesthesia with those who received regional anesthesia.

Case reports

We reviewed the medical records of 19 women who underwent our protocol for management of placenta accreta/percreta during the period December 2002 to July 2008 at our hospital. Approximately 1 hour prior to the planned cesarean section, a 5-French balloon catheter was inserted and placed in bilateral common iliac arteries in the Department of Interventional Radiology. In the operating room, under general or regional anesthesia, central venous and arterial access was established and bilateral ureteral double-J catheters were inserted first to prevent unintentional injury to the ureter during subsequent cesarean hysterectomy.

Seven patients underwent spinal anesthesia with 0.5% hyperbaric bupimarcaine 10–11 mg, four of whom were converted to endotracheal general anesthesia (ETGA) before cesarean section. Five patients underwent intravenous general anesthesia (IVGA) with ketamine 25–50 mg, atropine 0.5 mg, and propofol infusion 300 μg/kg/min; all were eventually converted to ETGA with additional anesthetics before cesarean section. Seven patients underwent ETGA with atropine 0.5 mg, Pentothal (sodium thiopental) 4–5 mg/kg, and succinylcholine chloride 1–1.5 mg/kg. Anesthesia was maintained with sevoflurane throughout the procedure. Patient age, gravidity, parity, gestational age, induction-to-delivery period, birth weight, and 1- and 5-minute Apgar scores are shown in Table 1.

The 5-minute Apgar score was ≥7 in all of the neonates. However, the 1-minute Apgar score was < 7, and immediate resuscitation was needed in 4/12 neonates (Patients 10, 13, 15, and 18) born to women under general anesthesia (ETGA or IVGA) and in 1/7 neonates (Patient 5) born to women under regional anesthesia. Furthermore, we found that the gestational age (28 weeks) and birth body weight (1364 g) were lower in Patient 5 in the regional anesthesia group. The mean induction-to-delivery period was 56 ± 15.1 minutes (range, 25–95 minutes).

Discussion

Although the 5-minute Apgar score is regarded as a better predictor of survival in infancy than the 1-minute Apgar score, a low 1-minute Apgar score indicates that the neonate requires medical attention [5]. An important factor affecting neonatal outcome is the time between the induction of anesthesia and clamping of the umbilical cord, as this represents the time of fetal exposure to maternally administered medication. If possible, induction-to-clamp time should be less than

Table 1
Demographic data, anesthesia method, induction to delivery period and Apgar score of the patients.

Patient	Maternal age (y)	Gestational age (wk)	Gravidity/parity	Induction to delivery period (min)	Birth weight (g)	1/5 min Apgar score	Anesthesia method
1	36	34	8/3	95	2568	7/8	SA
2	29	36	2/1	45	2180	7/9	SA
3	34	33	4/1	60	2332	7/8	SA[a]
4	37	36	2/1	30	2690	8/9	SA[b]
5	27	28	6/3	55	1364	6/8	SA[a]
6	31	34	4/1	50	2262	8/9	SA[a]
7	35	37	3/2	65	3080	9/9	SA[a]
8	34	34	4/2	70	2630	7/9	IVGA[a]
9	36	36	6/3	56	2694	8/9	IVGA[a]
10	38	33	2/1	40	2134	5/7	IVGA[a]
11	30	34	4/3	65	2002	7/9	IVGA[a]
12	31	36	1/1	55	2662	9/9	IVGA[a]
13	34	33	3/2	25	2734	4/7	ETGA
14	26	33	2/1	60	1696	8/9	ETGA
15	31	36	6/2	65	2404	4/9	ETGA
16	35	31	6/3	55	2150	7/9	ETGA
17	27	35	2/0	65	2578	7/9	ETGA
18	29	35	4/1	55	1330	5/8	ETGA
19	40	37	4/0	60	2696	8/9	ETGA

Groups	Maternal age (y)	Gestational age (wk)	Induction to delivery period (min)	Birth weight (g)	1 min Apgar score <7	5 min Apgar score <7
SA	32.71 ± 3.77	34.0 ± 3.0	57.14 ± 20.18	2353.7 ± 533.08	1/7	0/7
IVGA	33.8 ± 3.35	34.6 ± 1.34	57.2 ± 11.48	2424.4 ± 329.46	1/5	0/5
ETGA	31.71 ± 4.96	34.29 ± 2.06	55 ± 13.84	2226.86 ± 536.04	3/7	0/7
p	0.698	0.908	0.961	0.779	0.393	0.879

Data are number or mean ± SD.
ETGA = endotracheal general anesthesia; IVGA = intravenous general anesthesia; SA = spinal anesthesia.
[a] Converted to ETGA during cesarean hysterectomy.
[b] Spinal anesthesia combined with epidural anesthesia.

10 minutes and uterine incision-to-delivery time should be less than 3 minutes [6,7]. In our review, the mean induction-to-delivery period was 56 minutes, which is substantially longer than usual [8]. In women who received ETGA or IVGA during this period, the fetuses were most likely exposed to larger amounts of anesthetic agents before delivery than neonates born to women who received regional anesthesia. Based on our experience, spinal or combined epidural anesthesia should be considered as an alternative management strategy in this setting.

In this retrospective review, we did not attempt to demonstrate a difference in neonatal outcome between the different anesthesia methods. However, based on our clinical experience and observations, we highly suggest that regional anesthesia during the induction-to-delivery period for women with accrete/percreta who require cesarean hysterectomy is appropriate, especially in situations in which poor neonatal outcome is expected.

Summary

Placenta accreta/percreta is associated with catastrophic hemorrhage. In our institution, occlusion balloon catheters are commonly placed in bilateral common iliac arteries in order to reduce blood loss and facilitate surgery in patients with this obstetric complication. Few studies, however, have evaluated the effect of different anesthetic methods for cesarean hysterectomy on neonatal outcome. A retrospective analysis of 19 women with placenta accreta/percreta who underwent cesarean hysterectomy in our hospital, revealed that the 1-minute Apgar score was <7 in 4/12 neonates born to women who underwent general anesthesia and in 1/7 neonates born to mothers who received regional anesthesia. We acknowledge that the retrospective nature of this study makes it difficult to conclude whether the different anesthesia management strategies had an impact on Apgar score; however, according to our clinical observation, regional anesthesia during the induction-to-delivery period may be a better alternative, especially in situations in which poor neonatal outcome is expected.

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