ORIGINAL ARTICLE

Where does ergometrine stand in prevention of postpartum haemorrhage in caesarean section?

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Abstract

Objective: To compare the safety and efficacy of 10 units of intravenous syntocinon alone with 10 units intravenous syntocinon and 0.25mg intramuscular ergometrine in the prevention of atonic uterine haemorrhage during caesarean section.

Method: The quasi-experimental study was conducted at the Maternal and Child Health Centre, Unit I, Pakistan Institute of Medical Sciences, Islamabad, from November 1, 2010 to February 28, 2011. All women undergoing caesarean section were included in the study. Patients were given intravenous 10 units syntocinon alone intra-operatively from November 1 to December 31, 2010, while 0.25mg ergometrine intramuscular was added to 10 units intravenous syntocinon from January 1 to February 28, 2011. Frequency of postpartum haemorrhage, adverse effects of drugs and maternal morbidity and mortality were assessed by using chi square test. P <0.05 was taken as statistically significant.

Results: Of the total number of 701 subjects, 378 (54%) women were given 10 units syntocinon and 323 (46%) were given 0.25mg ergometrine in addition to 10 units syntocinon. The mean age in the syntocinon group was 28±3.5 yrs with gestational age of 37.5±2wks, while that in syntocinon-ergometrine group was 29±3.4 years and 38±2 weeks respectively. Postpartum haemorrhage in the syntocinon group was found in 38 (10%) women versus 05 (1.5%) women) in the other group (p<0.001). Adverse effects like nausea, vomiting and raised blood pressure were slightly more with syntocinon-ergometrine than syntocinon alone (n=56; 15.3% vs n=35; 9.2%), but it was not statistically significant. Post partum haemorrhage was responsible for 40% of maternal mortality during the study period and that was in the syntocinon group.

Conclusion: Prophylactic ergometrine in addition to syntocinon is superior to syntocinon alone in decreasing frequency of postpartum haemorrhage in caesarean section and associated maternal morbidity and mortality. Regarding safety profile, the two groups showed no statistically significant change.

Keywords: Ergometrine, Syntocinon, Caesarean, PPH. (JPMA 64: 911; 2014)

Introduction

Postpartum haemorrhage (PPH) is one of the major causes of maternal morbidity and mortality throughout the world. Of all deliveries, 5-15% may result in PPH with an incidence of 2-4% after vaginal births and 6% after caesarean section (CS).[1] Up to 358,000 maternal deaths are reported worldwide every year, and 99% of them occur in developing countries. PPH is responsible for one-third of these maternal deaths.[2] Pakistan Demographic Health Survey (2006-7) shows PPH as the leading direct cause of maternal deaths, accounting for 27.2% of maternal deaths.[3]

PPH can be prevented through proper assessment and treatment. Majority of research on this subject has focussed on efforts to prevent uterine atony, which is responsible for 75-90% of primary PPH. This includes identification of women at risk for atonic haemorrhage, active management of third stage of labour (AMTSL) and the routine use of uterotonics in CS, which reduces the risk of PPH by 60%.[4] Different uterotonics currently in use for the prevention of PPH during CS are syntocinon, syntometrine, ergometrine, prostaglandin F2 (PGF2) alpha and misoprostol. Of these, five units of intravenous (IV) syntocinon is recommended as a standard evidence-based drug, while prophylactic use of syntometrine (5 units syntocinon and 0.5mg ergometrine) has been discontinued because of concerns over safety profile (Level III evidence).[4,5] Keeping in view the significance of this subject, the current study was conducted to highlight the role of ergometrine in CS for the prevention of atonic uterine haemorrhage.

Considering the high incidence of anaemia in our country and in an effort to minimise blood loss, our unit policy from 1996 is IV syntometrine (10units syntocinon and 0.25mg ergometrine) at the delivery of anterior shoulder of baby for all deliveries, including CS. As a result of this

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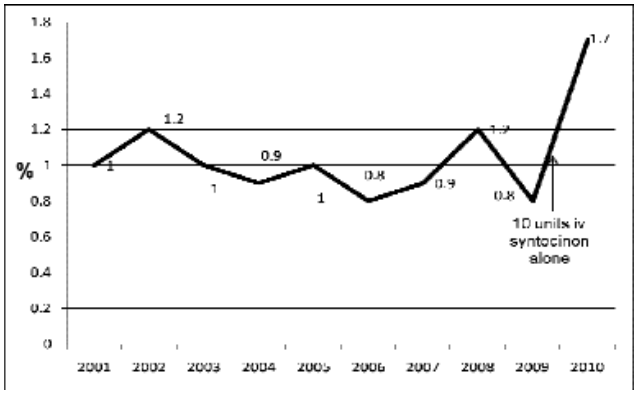
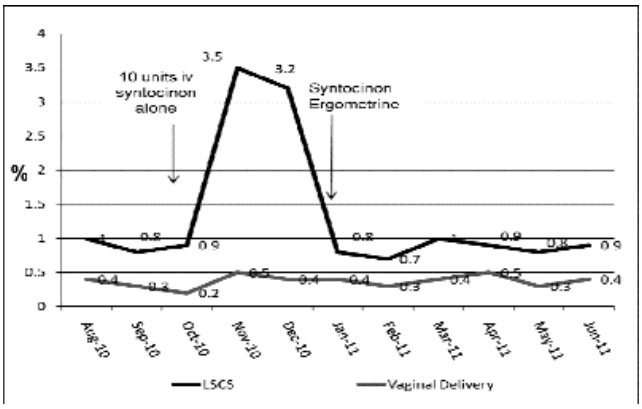


Figure-1: Trend of Postpartum Haemorrhage.



Lower segment caesarean section.

Figure-2: Postpartum Haemorrhage in normal delivery versus Caesarean section.

protocol, the incidence of PPH at our unit over the past 10 years is around 1%, as shown in Figure-1. Following a single incidence of cerebral haemorrhage in Oct 2010 (which later turned out to be Arteriovenous Malformation), the protocol of IV syntometrine during CS was replaced by 10 units IV syntocinon by anaesthetist, as per Royal College of Obstetricians and Gynaecologists (RCOG) and World Health Organisation (WHO) recommendations.[4,5] Following this regimen a sharp rise in incidence of PPH was seen after CS, while that after vaginal delivery during the same time period remained the same (Figure-2). Detailed audit was conducted to find out the reasons, in addition to implementation of previous protocol (10 units IV syntocinon + 0.25mg intramuscular [IM] ergometrine).

Subjects and Methods

The quasi-experimental study was conducted at the Maternal and Child Health Centre, Unit I at the Pakistan Institute of Medical Sciences, Islamabad, from November 1, 2010 to February 28, 2011. All women undergoing elective or emergency CS were enrolled, while those who delivered vaginally or with secondary PPH were excluded.

Convenience non-probability sampling was employed and the sample size was calculated using WHO sample size calculator taking confidence level of 95%, the anticipated population proportion to be 20%, and absolute required precision of 5%. The statistical calculation showed a minimum required sample size of 246 patients in each group. All women fulfilling inclusion exclusion criteria and undergoing CS were included in the study. In this time-based study, a total of 701 patients were included.

Ten units IV syntocinon alone was given intra-operatively from November 1 to December 31, 2010, following which a sharp rise in the incidence of PPH was observed. Detailed weekly audit was conducted in addition to 24-hour labour ward report to find out the reasons behind this increase in PPH. Unit protocol was revised and women were given 0.25mg IM ergometrine in addition to 10 units IV syntocinon from January 1 to February 28, 2011. Maternal blood pressure (BP) was recorded preoperatively, immediately after CS and then then1 hourly for 6 hours afterwards. Patients were kept under observation in high dependency area for 6 hours. Detailed history, clinical examination and co-morbid diseases such as diabetes mellitus, cardiac disease, hypertension, pre-eclampsia and poly-hydraminos etc. were recorded into a structured proforma. The primary outcome measures were the frequency of PPH and drug-related side effects. Secondary outcome measures were PPH-related maternal morbidity and mortality. The data was analysed by using SPSS version 10. Chi square test was used to compare the efficacy and safety of the two drugs. P value less than 0.05 was taken as statistically significant.

Results

The study comprised 701 subjects (Figure-3). Of these, 378 (56%) women were given 10 units IV Syntocinon from November 1 to December 31, 2010, and 0.25mg IM ergometrine and 10 units IV syntocinon was given to 323 (44%) women from January 1 to February 28, 2011. The mean age in syntocinon group was 28±3.5 years with gestational age of 37.5±2wks, while that in syntocinon-ergometrine group was 29±3.4yrs and 38±2wks respectively (Table-1). Almost 30% of women in both groups were nulliparous (28 vs. 26) (Table-1). Both the groups were comparable regarding indications of CS.

Our results showed that the frequency of PPH in

Table-1: Demographic characteristics.

Variables	Syntocinon alone n =378	Syntocinon-Ergometrine n =323
Mean Age	28±3.5	29±3.4
Parity n (%)		
Nulliparous	28(30.3)	26(29.3)
Multiparous	350(59.7)	297(60.7)
Mean Gestational Age	37.5±2	38±1.8

Table-2: Frequency of Postpartum Haemorrhage (n=701).

	Syntocinon alone n =378		Syntocinon-Ergometrine n =323		P value
	n/N	%	n/N	%	
Em LSCS	26/278	9.3	04/224	1.7	0.003
El LSCS	12/100	12	01/99	1	0.004
Total	38/378	10	05	1.5	0.004

Em LSCS: Emergency lower segment caesarean section.
El LSCS: Elective lower segment caesarean section.
*p value <0.05 was considered significant.

Table-3: Adverse effects.

	Syntocinon alone n =378		Syntocinon-Ergometrine n =323		P value
	n	%	n	%	
Nausea	21	5.5	30	9.2	0.079
Vomiting	10	2.6	16	4.9	0.065
Increase in Blood Pressure	04	1	10	3	0.062

*p value <0.05 was considered significant.

syntocinon group was significantly more than syntocinon-ergometrine group (n=38; 10% vs. N=05; 1.5% respectively, p<0.004). It was twice in emergency CS compared to elective CS in both groups (Table-2). Regarding the safety profile, adverse effects (nausea, vomiting, raised BP) were observed slightly more in syntocinon-ergometrine (n=56; 15.3%) group than syntocinon (n=35; 9.2%), though it was not statistically significant (Table-3).

Syntocinon alone resulted in increased maternal morbidity such as anaemia and need for blood transfusion than syntocinon-ergometrine group (Table-4). Surgical interventions were done more in the syntocinon group with increased number of hysterectomies (n=12;3.1%), half of which were done due to uterine atony while only one (8.3%) patient required hysterectomy in syntocinon-ergometrine group and that too was a case of placenta parevia. PPH was responsible for 40% of maternal mortality during the study period and that too was in the syntocinon group.

Table-4: Maternal Morbidity.

	Syntocinon alone n =378		Syntocinon-Ergometrine n =323		P value
	n	%	n	%	
Anaemia (Hb<10g/dl)	32	8.4	03	0.9	0.003*
Blood Transfusion	28	7.4	02	0.6	0.001
B Lynch	20	5.3	01	0.3	0.002
Hysterectomy	12	3.1	01	0.3	0.004

Hb: Haemoglobin
*p value <0.05 was considered significant.

Discussion

The evidence that prophylactic uterotonics during CS reduce the frequency of PPH has been established for the last 17 years, thus decreasing the need for blood transfusion, postpartum anaemia and less use of additional therapeutic uterotonic drugs. However, there is no consensus on the ideal uterotonic and its route of administration. WHO and RCOG recommend 5 units of IV syntocinon in preference to ergometrine, syntometrine (5IU syntocinon plus 0.5mg ergometrine) or misoprostol, for prevention of PPH during CS.[4,5] Ergometrine was withdrawn in the early 1980s because of its adverse effects. Since then, multiple randomised controlled trials have been conducted on the subject, but all of them were done in women undergoing vaginal delivery and used 0.5mg of ergometrine[6-9] unlike our study which was done with 0.25mg ergometrine in women undergoing CS.

The frequency of PPH after CS in our study was 6.1% (43 women). Local studies have reported lower frequencies of 1.58%[10] and 1.2%[11] while higher incidences of 7%[12] and 9.5%[13] have also been reported in literature. Our study showed that syntocinon-ergometrine combination is significantly associated with decreased frequency of PPH compared to syntocinon alone. Although, adverse effects were observed slightly more with syntocinon-ergometrine combination, but it was not statistically significant. Similar results have been shown by a study which showed that addition of 0.5mg of ergometrine to 5 units syntocinon during CS resulted in reduced number of massive PPH due to atonic uterus with an increased incidence of nausea and vomiting.[14] Our results were, however, contrary to the Cochrane review which showed that ergometrine-syntocinon was more effective than syntocinon alone for preventing minor PPH with significantly more side effects.[8]

Anaemia was seen more in syntocinon alone group compared to syntocinon-ergometrine with increased number of blood transfusions in this group. This was in contrast with the Cochrane review which showed no difference in necessity for blood transfusion in both groups.[8]

Surgical interventions were done more in the syntocinon group compared to the syntocinon-ergometrine combination, as 12 (3.1%) women in the syntocinon group ended up with hysterectomy; a result similar to an earlier study.[13] Almost half of the hysterectomies were done due to uterine atony which is comparable to that reported by other researchers.[10,11,13,15] Maternal mortality due to PPH in the syntocinon group in our study was 40%; similar to that reported earlier.[15] Comparable mortality rates due to PPH have been reported in Indonesia, Philippines and Guatemala.[15]

As the reason of withdrawal of ergometrine was its safety profile, it may be hypothesised that these side effects are dose-dependent, as we used 0.25mg ergometrine in our study unlike all the other studies reported in the literature.[6-9] Our study also showed significant reduction in maternal morbidity and mortality with the use of syntocinon-ergometrine combination. This issue has not been addressed in any other study before.

Hence, withdrawal of ergometrine altogether is not justified, especially in developing countries like Pakistan, where there are limited health resources and facilities like blood products, and health personnel are not available round the clock. We strongly feel that there is a need for its reappraisal in tertiary care hospitals where its storage and administration is not an issue.

Conclusion

The study showed that prophylactic IM ergometrine in addition to IV syntocinon is superior to syntocinon alone in decreasing incidence of PPH in CS and associated morbidity and mortality. Regarding safety profile, the two groups showed no statistically significant change. It is suggested that ergometrine should be given to at least high-risk PPH patients. However, the IV route may be replaced by IM route. As for the safety profile, randomised controlled trials should be done internationally using 0.25mg of ergometrine to establish the risk of PPH versus side effects of ergometrine.

References

1. Pal SA. Haemorrhage and Maternal Morbidity and Mortality in Pakistan. J Pak Med Assoc 2007; 57: 576-7.
2. Maternal mortality page. UNICEF Monitoring the Situation of Children and Women. Dec, 2011.
3. Pakistan Demographic Health Survey (PDHS) 2006-2007. Islamabad, National Institute of Population Studies, 2008.
4. RCOG. Guidelines for prevention and management of postpartum haemorrhage. Greentopguideline. no. 52, May 2009.
5. Mathai, Gülmezoglu M, Hill AM, Suzanne. WHO Recommendations for prevention of postpartum haemorrhage, 2007.
6. Rashid M, Clark A, Rashid MH. A randomised controlled trial comparing the efficacy of intramuscular syntometrine and intravenous syntocinon, in preventing postpartum haemorrhage. J Obstet Gynaecol 2009; 29: 396-401.
7. Orji E, Agwu F, Loto O, Olaleye O. A randomized comparative study of prophylactic oxytocin versus ergometrine in the third stage of labor. Int J Gynaecol Obstet 2008; 101: 129-32.
8. McDonald S, Abbot JM, Higgins SP. Prophylactic ergometrine oxytocin vs oxytocin for third stage of labour. Cochrane Database Syst Rev 2004; 1: CD000201.
9. Sadiq S, Hasmi U, Aman Q, Zareen N .Prophylactic use of oxytocin (syntocinon) vs oxytocin plus ergometrine (syntometrine) for prevention of post partum haemorrhage. Pak J Surgery 2008; 24: 4.
10. Naz T, Hassan L,.Primary Postpartum Hemorrhage; profile at a tertiary care hospital. J Med Sci 2010; 18: 49-53.
11. Zuberi NF, Durocher J, Sikander R, Baber N, Blum J, Walravn G. Misoprostol in addition to routine treatment of postpartum hemorrhage. A hospital-based randomized- controlled trial in Karachi, Pakistan. BMC Pregnancy childbirth 2008; 8: 40-7.
12. Naz H, Sarwar I, Fawad A, Nisa AU .Maternal morbidity and mortality due to primary PPH-Experience at Ayub Teaching Hospital Abbottabad. J Ayub Med Coll Abbottabad 2008; 20: 59-65.
13. Yousuf F, Haider G Postpartum hemorrhage: an experience at tertiary care hospital. J Surg Pakistan 2009; 14: 80-4.
14. Lourens R, Paterson-Brown S .Ergometrine given during caesarean section and incidence of delayed postpartum haemorrhage due to uterine atony. J Obstet Gynaecol 2007; 27: 795-7.
15. Bibi S,Danish N, Fawad A, Jamil M. An audit of primary Post Partum Haemorrhage. J Ayub Med Coll Abbottabad 2007; 19: 102-6.
16. Saito K, Haruki A, Ishikawa H, Takahashi T, Nagase H, Koyama M, et al. Prospective study of intramuscular ergometrine compared with intramuscular oxytocin for prevention of postpartum hemorrhage. J Obstet Gynaecol Res 2007; 33: 254-8.