Prevention of postpartum haemorrhage

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Postpartum haemorrhage (PPH) is an important cause of maternal morbidity and mortality. Prevention is always better than treatment. In this issue of *Hong Kong Medical Journal*, Tse et al[1] have compared the use of carbetocin with oxytocin infusion in reducing the need for additional uterotonics or procedures in women at increased risk for PPH undergoing Caesarean deliveries in a single Hospital Authority (HA) obstetric unit. Carbetocin was better than oxytocin infusion in reducing the requirement of additional uterotonics or procedures in pregnant women undergoing Caesarean sections with multiple pregnancies or major placenta praevia. The findings echo the first of the three recommendations from the territory-wide HA survey on massive PPH conducted in 2013.[2,3]

With the objectives of studying the characteristics of patients with massive primary PPH (defined as ≥1500 mL within the first 24 hours after delivery, which is the clinical indicator for obstetric performance in HA hospitals) and exploring areas for improvement in terms of prevention and treatment, a prospective study[2,3] was conducted during the year 2013 in all the eight HA obstetric units using a pre-designed code sheet to record the details of all patients with massive primary PPH, including causes, risk factors, mode of delivery, interventions (uterotonic agents, second-line therapies and emergency hysterectomy), use of blood products, and maternal outcome.

Massive primary PPH occurred in 0.76% (n=277) of all deliveries (n=36 510) in HA obstetric units in 2013. The incidence was comparable to those reported in international literature. The majority occurred after Caesarean sections (84.1%). Uterine atony (37.5%), placenta praevia/accreta (49.9%), and uterine wound bleeding/tear during Caesarean section (24.2%) were the three most common causes. The median total blood loss was 2000 mL (range, 1500-20 000 mL). Coagulopathy occurred in 16.2% (n=45). A quarter (n=76, 27.4%) required intensive care or high dependent unit admission. There was no maternal mortality.

Second-line therapies (balloon tamponade, compression sutures and uterine artery/internal iliac artery embolisation or surgical ligation) were used in 40.1% (n=111). Emergency hysterectomy was required in 8.7% (n=24). A total of 1052 units of packed cells, 670 units of platelets, 568 units of fresh frozen plasma, and 200 units of cryoprecipitate were transfused.

The study identified three areas for improvement: (1) to increase the choice of uterotonic agents (carbetocin has been incorporated into HA Drug Formulary since January 2017, mainly for prevention of PPH in women at risk such as twin pregnancy, large fibroids, polyhydramnios, fetal macrosomia, and placenta praevia. In 2017, a total of 875 ampoules have been used in HA obstetric units, rising to 2500 ampoules in 2018, and 2865 ampoules in 2019); (2) to step up the use (and early use) of second-line therapies, and to watch out for failures from second-line therapy; (3) to reduce the incidence of placenta praevia/accreta through education and to improve its management at multiple care levels.

Carbetocin is a long-acting synthetic analogue of oxytocin indicated for prevention of uterine atony after Caesarean section. It is administered as a slow intravenous injection over 1 minute, with a rapid onset of uterine contraction within 2 minutes and lasting for several hours. It is also a heat-stable compound which does not require refrigeration. Latest Cochrane reviews showed that carbetocin may have some additional benefits compared with oxytocin and appears to be without an increase in adverse effects.[4] The Carbetocin HAeMorrhage PreventION (CHAMPION) trial[5] showed that carbetocin was non-inferior to oxytocin for the prevention of PPH after vaginal delivery as well.

The main disadvantage of using carbetocin in preventing PPH is its cost, making it much less cost-effective when compared with other uterotonic drugs.[6] For local reference, carbetocin (single dose of 100 μg) costs HK$200, as compared with oxytocin (40 IU infusion, HK$32), syntometrine (single dose, HK$27), and misoprostol (800 μg, HK$7). As a result, when carbetocin was introduced into HA Drug Formulary in 2017, we have limited its use to those women with high-risk factors for PPH after Caesarean sections such as twin pregnancy, large fibroids, polyhydramnios, fetal macrosomia, and placenta praevia. For example, in 2018, only 2500/35 016 or 7.1% of all deliveries in HA had carbetocin for PPH prophylaxis when compared with around 90% of deliveries in private hospitals in Hong Kong. There is capacity to increase the use of carbetocin in HA by including more women with risk factors for PPH such as prolonged induction

of labour (eg, oxytocin ≥12 hours), high parity (eg, ≥para 3), history of PPH, and others. These risk factors have not been included in Tse et al's study.[1] Carbetocin should not only be considered for Caesarean sections, but also for vaginal deliveries with same risk factors for PPH. Furthermore, the role of using carbetocin as treatment for PPH could be explored.

In addition to single-centre studies on the efficacy of a single drug or procedure on the prevention and treatment of PPH, further studies are required on the overall impact of the introduction of uterotonic drugs such as carbetocin; non-uterotonic drugs such as tranexamic acid; increasing use of second-line procedures[7] such as balloon tamponade, compression sutures and uterine artery embolisation; and new patient blood management such as intravenous iron therapy, particularly in the current era of inadequate blood donation, being further aggravated by coronavirus disease 2019 (COVID-19).

Interestingly, with all the new modalities of prevention and treatment of PPH, the overall figures of primary PPH ≥500 mL (traditional definition), ≥1000 mL or ≥1500 mL (defined as massive PPH), including emergency hysterectomies for massive PPH, have not been improved in HA from 2013 to 2018 (Table).[8] This phenomenon is different from what had been observed in a single obstetric unit over a different time period from 2006 to 2011.[9] Fortunately, maternal mortality is still rare. Further studies are definitely indicated to look into the territory-wide HA data (using the Obstetrics Clinical Information System) to see whether the new modalities are not as effective as they are expected to be or our pregnant population is indeed becoming more and more high risk for PPH.

TABLE. Postpartum haemorrhage (% of total deliveries) in Hospital Authority obstetric units[8]

Year	No. of total deliveries	PPH ≥500 mL	PPH ≥1000 mL	PPH ≥1500 mL	Emergency hysterectomy
2013	36 510	1754 (4.8%)	686 (1.9%)	277 (0.8%)	26 (0.07%)
2014	39 575	1892 (4.8%)	685 (1.7%)	277 (0.7%)	21 (0.05%)
2015	39 038	1932 (5.0%)	695 (1.8%)	265 (0.7%)	20 (0.05%)
2016	40 100	2079 (5.2%)	710 (1.8%)	253 (0.6%)	18 (0.04%)
2017	37 298	2293 (6.2%)	869 (2.3%)	328 (0.9%)	29 (0.08%)
2018	35 016	2100 (6.0%)	858 (2.5%)	333 (1.0%)	16 (0.05%)

Abbreviation: PPH = postpartum haemorrhage

Author contributions

The author contributed to the manuscript, approved the final version for publication, and takes responsibility for its accuracy and integrity.

Conflicts of interest

The author has disclosed no conflicts of interest.

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