

Case report: Posthemorrhagic postpartum hysterectomy in a 24-year-old G1P0 patient.

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Case Presentation

The labor of a 24-year-old G1P0 female was induced at 37 weeks of amenorrhea due to a diaphragmatic hernia in the fetus. The patient had an ASA I score, and had undergone an otherwise unremarkable pregnancy. The labor was induced using prostaglandin and oxytocin and hemorrhage gravidarum occurred at a 4 cm cervical dilation. An emergency Cesarean section under spinal anesthesia was decided, due to acute fetal pain with failed instrumental delivery of the fetus. Uterine atony occurred immediately after the extraction of the fetus, in spite of a 10 U bolus dose of oxytocin, with a 0.50 mg injection of carboprost, and a 10 U oxytocin infusion over a 24-hour period. A second surgical look took place under general anesthesia following patient paleness and tachycardia. It was decided to ligate the internal iliac artery for hemostasis due to secondary uterine atony. A second return to the operating room occurred, because of the generally poor state of the patient. Non-radical subtotal hysterectomy was performed, in spite of the previously taken actions. A continuous bleeding in spite of the hysterectomy led, at that point, to the decision to perform a left annexectomy. Fluid resuscitation during the whole process was tremendous, including 14 bags of red blood cells, 12 fresh frozen plasma units, and 1 platelet pool.

Discussion

Postpartum hemorrhages are obstetrical complications, which can rapidly become life threatening. They are defined as follows: a blood loss of either more than 500 ml after vaginal delivery or more than 750 ml after a Cesarean section. This type of hemorrhage is described as severe when the blood loss consists of more than 1500 mL, more than 500 mL/min, or when hemoglobin concentration drops by at least 4 g/dL. They can either be primary, when a blood loss of more than 500 mL occurs over the first 24 hours post-delivery, or secondary, when excessive bleeding occurs between the first 24 hours and 12 weeks post-delivery. Scientific societies are gradually favoring the kinetic approach instead of the blood loss approach. In this regard, postpartum hemorrhage is defined by a blood loss of more than 30% of the blood volume, a blood loss of more than 50% during the first three post-delivery hours, or a transfusion of more than 4 bags of red blood cells within one hour or more [1].

The visual estimation of blood loss is usually not accurate, and this can lead to a delayed diagnosis or inadequate treatment. The frequency postpartum hemorrhage is estimated to range between 3.5 to 5%. Between 2003 and 2011, an increase in this frequency has been registered in the developed countries, but did not lead to an increase in maternal mortality rate, in spite of the massive blood transfers these patients required [2]. However, the maternal mortality rate is high in that case, insofar as postpartum hemorrhage is responsible for a half of maternal deaths. It is also responsible for 1/3 of perinatal deaths in African and Asian countries, and is the 3rd most common cause of maternal mortality in the UK [1].

The risk factors of massive transfusions in case of postpartum hemorrhage are extreme age ranges, preterm births, inadequate placentation, antepartum hemorrhage, Asian

phenotype, and obesity. Risk factors of massive hemorrhage following vaginal delivery are instrumental delivery, gestational hypertension, and excessive smoking. Cesarean sections in multiparous patients are also associated with a higher risk of massive blood transfer [2]. The independent mortality risk factors are the under-estimation of the hemorrhage severity, unavailability of labile blood products in due time, lack of clear measurable algorithms, lack of experience or knowledge of the medical staff, poor cross-disciplinary communication, and inadequate communication [3].

The conservative first line initial treatment includes uterotonic medications (oxytocin, prostaglandin). In case of failure, uterine packing may be performed followed by the insertion of a Bakri Balloon, B-Lynch suture, selective arterial ligation, or selective embolization. All these actions are aimed at decreasing the frequency of hysterectomy, which is associated with an increase of the morbi-mortality rate, and severe hemorrhage [4].

The treatment algorithm has 4 stages:

In any case, the purpose of the first stage is to gain uterine tonicity. Up to 40 IU of oxytocin should be administered over 30 minutes. Boluses are not recommended because they reduce the peripheral vascular resistance and cause a fall in blood pressure. Alternatively, administering 100 µg of carbetocin through a slow IV drip can reduce the postoperative uterotonic needs, but does not reduce the frequency of postpartum hemorrhages. If bleeding becomes moderate, 800 µg of misoprostol may be given through an oral or administration. The second stage objectives are the management of uterine tonus, coagulation and temperature, and ensuring hemodynamic stability. In that respect, the deadly trio should be kept in mind: coagulopathy, hypothermia and acidosis. To enhance uterine tonus, prostaglandins (sulprostone) from 500 µg over 60 minutes up to 1500 µg/24h should be administered. Regarding coagulation, items used for standard testing (international normalized ratio, prothrombin time) can provide results within 45 to 60 minutes. However, because of factors combination, the PLC will display incorrect values. The best sensitivity indicators are the thrombelastography (TEG) and the thromboelastometry (ROTEM), which allow real-time coagulation analysis. Coagulation and fibrinolysis are closely linked. In general surgery, the administration of tranexamic acid is known to help reducing transfusion needs and additional interventions. The same would apply in obstetrics. In particular, a study carried out in 2011 showed that the incidence of blood loss in postpartum hemorrhage resulting from vaginal delivery was lower in females having been given high doses of Exacyl® (4 g IV bolus does followed by 1 g/6h) as compared to the control group. However, two cases of cortical necrosis have been reported. In this context of coagulation, it is also important to pay attention to the fibrinogen level, as it will be consumed first. The level must stay above 2 g/L. In this regard, retrospective studies have shown that a fall in fibrinogen is a predictive factor of a massive hemorrhage [7]. Regarding blood transfer, patients who received a RBC/FFP ratio of 1:1 are known to show improved survival and less repeated surgeries in case of prior sulprostone administration. The 3rd stage should aim at reaching hemodynamic stability and stopping bleeding. Lastly, in case of persistent bleeding, the 4th stage recommend invasive methods to be used. First, a uterine traction laparotomy and uterine massage with clamping of the hypogastric vessels and uterine artery is recommended. Second, a temporary interruption of surgery and stabilization of the patient should occur. Third, B-Lynch sutures and/or embolization through interventional radiology is recommended. These sutures were first described in 1996, but, in time, new types of sutures have emerged and allowed in turn to put pressure on any part of the uterus. In a five-year audit conducted on 26,029 births, the rate of patients having suffered from severe postpartum hemorrhage was 0.4%. Thirty five patients benefitted from this technique, in order to staunch the hemorrhage. The success rate of this first-line treatment was 66%. The success rate of this treatment, coupled with ligation of the uterine arteries was 74%. In case of uterine atony, the success rate of the treatment was 61%, and 86% in the event of placenta praevia [4]. When comparing B-

Lynch sutures to the Bakri Balloon, no significant difference is shown regarding the quality of the staunching of the

The first stage consists in recognizing the postpartum hemorrhage, setting up a monitoring system, and identifying its cause (the 4T: uterine Tone evoking a uterine rupture, uterine atony, lacerations; Tissue evoking retained placenta; Trauma; Thrombin evoking Disseminated Intravascular Coagulation). Once the postpartum hemorrhage is recognized according to the above-mentioned criteria, two large bore peripheral venous lines are to be placed. As far as crystalloid and colloid infusions are concerned, they both have pros and cons. In particular, colloids may interfere with coagulation, and crystalloids may hemodilute, thus provoking coagulopathy. There is no clear evidence that colloids reduce the mortality rate. Contrarily, they may even increase it, as they are said to cause direct renal injury [5].

Intramuscular hemorrhage in terms of pre and postoperative hemoglobin and hematocrit levels. Although, it takes less time to perform B-Lynch sutures than to place the Balloon, cases of uterine necrosis and impaired fertility were reported. Nonetheless, this technique will be privileged in case of uterine atony [8]. Embolization remains the preferred choice to stop bleeding and avoid hysterectomy, although it requires around the clock availability of an interventional radiologist. Arterial embolization is favored in case of uterotonic-resistant uterine atony, and in particular after vaginal delivery, in case of cervico-uterine bleeding, vaginal thrombus, or tearing of the birth canal. Embolization may also be discussed in case of persisting hemorrhage after arterial ligation or hysterectomy. First-line arterial embolization could be contemplated in case of placental insertion abnormalities (placenta accreta), to try avoiding hysterectomy [9]. However, it is not deprived of risks. Cases of uterine necrosis and lumbosacral plexus lesions have been reported [10].

Conclusion

Postpartum hemorrhage remains a worrying cause of perinatal mortality; it is of the utmost importance to identify it and to have clear, measurable and validated treatment algorithms. Uterotonic medications and hemodynamic support allow stabilization of the situation. However, it is important not to lose sight of solutions such as embolization or surgery in order to overcome it. It is also necessary to know the risk factors and get an accurate estimation of the blood loss to anticipate treatment and avoid the worst.

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