

Interventional radiology to treat severe obstetric hemorrhages

Radiologia intervencionista para o tratamento das hemorragias obstétricas graves

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ABSTRACT

The author discusses the recent role of interventional radiology to prevent postpartum hemorrhagic complications that represent an important cause of maternal morbidity and mortality all over the world. Hence, hemorrhage control is mandatory. Traditional management and recent minimally invasive radiological procedures by means of inserting occluding balloons into appropriate vessels are analyzed. It is advisable that maternity hospitals have protocols for the management of obstetric hemorrhage by means of interventional radiology, either in their own departments or in association with other large healthcare units that may have proper equipment and trained staff. However, the evidence related to its efficacy is limited to series of cases analyzed in tertiary centers. This is a promising technique that may be applied to severe obstetric hemorrhages and may bring beneficial results in the majority of cases.

Keywords: Postpartum, hemorrhage; Placenta; Placenta accreta; Radiology, Interventional

RESUMO

O autor discute o recente papel da radiologia intervencionista para prevenir complicações hemorrágicas pós-parto que constituem importante causa de morbidade e mortalidade maternas em todo o mundo, o que torna mandatório o controle da hemorragia. São analisadas as condutas clássicas e as técnicas atuais minimamente invasivas de radiologia intervencionista por meio da inserção de balões em vasos apropriados. É aconselhável que as maternidades possuam protocolos para a aplicação dessas técnicas, quer seja nas ações internas ou em associação com outras instituições de maior porte que disponham dos equipamentos e pessoal especializado. Contudo, as evidências relativas à sua eficácia são ainda limitadas a séries de casos, analisadas em centros terciários. Essa é uma técnica promissora cuja aplicação nos casos de hemorragias obstétricas graves traz resultados benéficos na maioria das vezes.

Descritores: Hemorragia pós-parto; Placenta; Placenta acreta; Radiologia Intervencionista

Hemorrhagic complications are among the three major causes of maternal mortality all over the world. Classically, uterine massage, oxytocics, fluid replacement, uterine tamponade with gases or balloons (Bakri balloon), manual compression of the matrix, surgical repair in epithelial discontinuity, maintenance of placenta *in loco* and further treatment with methotrexate, or, the large stitches (B-Lynch) that make uterine envelopment are some of the measures used to stop bleeding, keep the patient alive and her reproductive capacity. Therefore, some more aggressive attitudes could be avoided, such as hysterectomy and ligation of the hypogastric arteries. After the major trauma of the hemorrhagic complication, often women have to bear the consequences of mutilating treatments. Unfortunately, in some cases, even these measures do not result in appropriate response, leading to maternal death. Hence, the search for new technologies to attenuate the sometimes disastrous effects of hemorrhage that complicate pregnancy, delivery and puerperium, resulted in using interventional radiology for control. Catheters are placed through the femoral arteries, with balloons in the distal end that can be inserted in the uterine arteries, or in the iliac arteries. The methodology consists of prophylactically inflating the balloons, during the surgical procedure (after removing the fetus, in case of C-section) or in the most timely situation, depending on each case. After controlling the blood loss, the balloons are deflated and the catheters are removed. If the hemostatic result is not satisfactory after deflating the balloons, embolization of arteries is performed, usually with an absorbable gelatin preparation (Gelfoam)⁽¹⁾. Few maternity hospitals have a permanent interventional radiology department, and most obstetric centers

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have no radiological equipment. If necessary, or when managing a patient in an emergency situation, it may be complicated to remove a severely ill patient to a radiology department of the hospital. It is even worse if an external team has to be called upon. It is assumed that at least 2 hours are necessary to have this group ready to intervene⁽²⁾. This huge time gap may be fatal for the patient. Maternity hospitals are advised to have protocols for interventional radiology techniques, for both internal actions or in association with large facilities that provide equipment and specialized staff⁽²⁾. Therefore, it is very important to make decisions in advance in cases expected to evolve with copious hemorrhage. Such is the case of placenta previa and, mainly, in women submitted to one or more C-sections, since they are subject to developing placental accretism of any grade (accreta, increta or percreta). The diagnosis of this severe condition is currently made by color Doppler flow imaging or by magnetic resonance, which is the gold standard⁽³⁾. With this tool it is possible to make diagnosis of accretism, and of its extension and depth. After diagnosing, pregnancy termination can be scheduled by means of a C-section, after inserting the catheters in the femoral arteries, in an appropriate radiological room, before any surgical intervention, either C-section or C-section and hysterectomy.

Interventional radiology can be associated to other procedures, such as uterine tamponade using Bakri balloon, to initiate stabilization of the patient⁽²⁾, followed by radiological intervention, or it may be followed by hysterectomy in more favorable conditions, as compared to cases not submitted to the procedure.

The Royal College of Obstetricians and Gynecologists (RCOG – UK)⁽¹⁾ published a protocol to apply interventional radiology in emergency or elective situations. The emergency indications reported are uterine atony after prolonged labor with or without C-section; surgical complications of uterine lesions during C-section; late hemorrhages in recovery units after vaginal delivery or C-section; and post-hysterectomy bleeding. As to elective situations, the main purpose is the prophylactic use of the procedure in the cases already diagnosed or suspect of placental accretism (mainly placenta previa in women previously submitted to C-section)⁽¹⁾.

The reports in the literature generally comprise few cases. One of the largest series described is composed of 42 women who underwent uterine arterial embolization after termination of pregnancy between 17 and 23 weeks, with subsequent incoercible hemorrhage. Twenty-two of them presented uterine atony, 7 abnormal placentation, 5 cervical lacerations, 3 uterine perforation and 5 other complications. There were six cases of placenta accreta.

The procedure was successful in avoiding hysterectomy in 38 out of 42 women (90%)⁽⁴⁾. Some studies showed over 90% success using the technique and 100% survival⁽⁵⁾.

In many series in the literature, interventional radiology demonstrates favorable results regarding maternal morbidity. An Australian study⁽⁶⁾ analyzed 26 cases of histologically-proven placental accretism (7 accreta, 5 increta and 14 percreta) and 8 were submitted to endovascular procedure. The authors found statistically significant reduction in blood loss, need of transfusions and transfused volume. The operative time was not different with or without catheterization, and there was no decrease in length of stay at the intensive care unit and at the hospital, but anesthesia time was longer. There was less need to perform hysterectomy⁽¹⁾.

A French study reported 17 cases collected in 128 months, divided into 2 groups: a preventive group when placenta accreta was diagnosed during pregnancy (6 cases) and a curative group (11 cases) diagnosed at delivery. Embolization was primarily successful in all cases. Among women in the preventive group, one underwent hysterectomy due to hemorrhage 2 days after the procedure, and another was submitted to a second embolization, due to hemorrhage 2 months after the initial embolization. Blood losses were significantly smaller in the preventive group, but later one case of intrauterine synechia and one case of amenorrhea were recorded⁽⁷⁾.

Nevertheless, not all authors agreed on the benefits of the method. There is a report on 69 women submitted to C-section and hysterectomy, diagnosed as having placenta accreta in a 10-year period. In 19 of them balloon catheters were placed, whereas 50 others underwent hysterectomy exclusively⁽⁸⁾. The authors did not observe differences regarding volume of blood loss, transfusions, operative time and postoperative length of hospital stay. Three accidents were registered in placement of the catheter, and one patient required arterial bypass. There is also a description of a case of uterine necrosis diagnosed ten days after arterial embolization with Gelfoam for difficult-to-control postpartum hemorrhage⁽⁹⁾.

The scarce literature data show that interventional radiology is a technique applied in cases of severe obstetric hemorrhages providing beneficial results in most cases. However, although it is a technique developed some time ago, its use in Obstetrics has not been frequent. It would be interesting to establish a protocol similar to that of the RCOG mentioned above, that very probably would lead to a drop in the huge maternal mortality rate due to hemorrhages, promoting rates survival, health of these women and preserving their reproductive capacity.

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