Perioperative Internal Iliac Artery Balloon Occlusion in Patients with Abnormal Placental Invasion

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Abnormal placental invasion is abnormal adherence of the placenta, either in whole or in part, to the underlying uterine wall [1]. Based on histopathology, it is divided into three grades: placenta accreta (the chorionic villi are in contact with the myometrium), placenta increta (the chorionic villi invade into the myometrium) and placenta percreta (the chorionic villi penetrate the uterine serosa and occasionally invade into adjacent organs) [1,2]

It causes significant adverse consequences for mother and fetus [3]. There is increased risk of severe intrapartum and postpartum bleeding, blood transfusion, caesarean hysterectomy, adjacent organ damage, intensive care unit admission, wound infection and total hospitalization days [3,4]. Also, there is increased risk of perinatal complications mainly due to preterm birth and small for gestational age fetuses [3]. Maternal death may occur in 7% of cases, despite optimal planning, transfusion management and surgical care [4,5].

The diagnosis of abnormal placental invasion usually established by ultrasonography and occasionally supplemented by magnetic resonance imaging (MRI) [6]. Early diagnosis of abnormal placental invasion in high-risk populations allows optimal management with multidisciplinary preoperative planning of a controlled delivery and significantly improves maternal outcome with little or no neonatal compromise [5,7,8]. In those patients the preferred strategy for timing of delivery under a variety of circumstances, is delivery at 34 weeks of gestation [9].

Uterine sparing surgery can be attempted dependent on the degree of placental invasion and patient’s strong desire for fertility preservation [5,10]. However, the recommended management of suspected abnormal placental invasion is planned preterm cesarean hysterectomy with the placenta left in situ, because removal of the placenta is associated with significant bleeding [5]. For the management of those high-risk patients, there are several surgical hemostatic techniques [11]. Prophylactic perioperative internal iliac artery balloon occlusion in cases of abnormal placental invasion was first reported in 1997 [12]. Despite initial enthusiasm, it has been a topic of debate for nearly 2 decades, because its efficacy remains unproven and controversial [5,7].

Undoubtedly internal iliac artery balloon occlusion reduce blood supply to the pelvic organs and may prevent life threatening intraoperative blood loss, reduce transfusion requirements and improve visualization of the surgical field during cesarean hysterectomy [13]. However the substantial network of collateral vessels in the female pelvis, many times limit the efficacy of this technique [13-17].

There are various strategies of intraoperative utilization of internal iliac artery balloons. In most studies internal iliac artery balloons inflated immediately after delivery of the fetus [7]. The major anastomotic channels of the female pelvis will function after internal iliac artery balloon occlusion, thus balloon inflation provides only transient relief in intraoperative blood loss [7,16,18]. The reduction of blood flow to pelvic structures may be successful, although complete cessation of perfusion probably cannot be accomplished [16]. Also, in many cases there is continued blood flow distal to the point of internal iliac artery balloon occlusion [16].

Therefore if internal iliac artery balloons inflated immediately after delivery of the fetus as further dissection of the uterine vasculature performed, there is a gradual increase in the rate of intraoperative blood loss [7,19]. Those patients, have significantly higher mean intraoperative blood loss and transfusion requirements as a result of the time and the efforts to avoid cesarean hysterectomy [7,18].

The most preferable approach is internal iliac artery balloons inflation, only with the onset of significant bleeding [7]. This approach may alleviate temporary the rate of blood loss, allowing for expeditious dissection of the uterine and cervical pedicles, and ultimately hysterectomy, while avoiding the development of additional collaterals [7].

However, the prophylactic perioperative use of internal iliac artery balloons cannot prevent caesarean hysterectomy. Also, it does not appear to reduce operative time or hospital stay [13].

Complications associated with the use of internal iliac artery balloons, have been documented in individual case reports and larger series [7,13,19]. They usually depend on operator experience, techniques, and equipment and individual patient characteristics [7].

The use of internal iliac artery balloons associated with: serious thromboembolic events (5%), lower limb ischemia, puncture site complications (hematomas, false aneurysms and dissection of femoral arteries) and other complications (bowel or ureter injury, air in pressurized lines, symptomatic hypotension) [13,20-22]. Although it is difficult to estimate the overall complication rate, it usually varies between 6-16% [7,13,18,19].

It is obvious that prospective randomized trials are needed to better assess the efficacy of both placement and intraoperative utilization of internal iliac artery balloons in patients with abnormal placental invasion.

References

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Received May 08, 2013; Accepted May 10, 2013; Published May 12, 2013


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