hemorrhage in the baby. Indeed, neonatal intracranial hemorrhage is described after cesarean section in both conditions, and the current advice is to recommend vaginal delivery (7,8). Pregnancy increases the risk of valve thrombosis. The time of greatest risk for venous thrombosis is immediately after delivery, and cesarean section further increases the risk up to 25-fold (9). We agree with Elkayam (5), and it is our policy to discontinue warfarin and start intravenous heparin, which does not cross the placenta and has a very short half-life, at 36 weeks in preparation for induction of labor or cesarean section at 38 weeks. We reserve cesarean section for the usual obstetric indications. Because Vitale et al. (1) state that “if the patient [on <5 mg of warfarin] prefers to have vaginal delivery, intravenous heparin over the last two weeks of gestation should be offered as an option,” we assume that they deem this to be a safe alternative. We would suggest that perhaps the emphasis should be reversed from routine cesarean section to routine vaginal delivery.

Catherine Nelson-Piercy, MRCP
Mary Ward, 7th Floor, North Wing
St. Thomas’ Hospital
Lambeth Palace Road
London SE1 7EH
United Kingdom
E-mail: catherine.nelson-piercy@gstt.sthames.nhs.uk

Eric Rosenthal, MRCP
Kate Harding, MRCOG
Susan Bewley, MRCOG

REFERENCES


REPLY

We read with great interest the letter by Nelson-Piercy et al. regarding our article (1). They gave us the benefit of their experience.

Routine Elective Cesarean Section Is Not Justified for Women With Mechanical Heart Valves

We congratulate Vitale et al. (1) for providing substantive evidence for a dose-dependent effect on adverse fetal outcome in pregnancies complicated by maternal warfarin therapy. In the United Kingdom, warfarin embryopathy is rare (2), and recently reported cases have occurred almost exclusively in women taking large (>9 mg) doses of warfarin (3). We agree with Vitale et al. (1) that the small risk of embryopathy (3.4% in their series), which may be confined to those requiring >5 mg to maintain an adequate International Normalized Ratio (INR), should not be used as a justification for recommending that women with prosthetic valves be managed with heparin throughout their pregnancy, as some have suggested (4). Indeed, an increased incidence of valve thrombosis in pregnant women with mechanical valves (albeit mostly older-generation prostheses in the mitral position) (5), managed with subcutaneous heparin versus warfarin, has been reported (6). However, Vitale et al. (1) have highlighted the risks of spontaneous miscarriage and stillbirth in warfarin-managed pregnancies and have demonstrated that this too is dose-dependent.

We have two concerns: First is delivery with only brief (two-day) discontinuation of warfarin therapy. As Vitale et al. pointed out, the immature fetal liver may not only lead to over-anticoagulation of the fetus despite a normal INR in the mother, but also slow clearance of warfarin by the fetus, leading to continued anticoagulation for up to 10 days after the mother stops taking warfarin. Although there were no cases of neonatal hemorrhage in this series, despite the fact that warfarin was almost certainly still present in the fetuses at the time of delivery, the numbers are small and only three babies in the >5 mg group had reached full term; second is the policy of routine elective cesarean section at 38 weeks. We do not agree that elective cesarean section “reduces the risk of perinatal intracranial hemorrhage in the fetus.” The arguments have been well rehearsed for other maternal conditions such as autoimmune thrombocytopenic purpura (7) and hemophilia carriers (8), when there may be a risk of intracranial hemorrhage in the baby. Indeed, neonatal intracranial hemorrhage is described after cesarean section in both conditions, and the current advice is to recommend vaginal delivery (7,8). Pregnancy increases the risk of valve thrombosis. The time of greatest risk for venous thrombosis is immediately after delivery, and cesarean section further increases the risk up to 25-fold (9). We agree with Elkayam (5), and it is our policy to discontinue warfarin and start intravenous heparin, which does not cross the placenta and has a very short half-life, at 36 weeks in preparation for induction of labor or cesarean section at 38 weeks. We reserve cesarean section for the usual obstetric indications. Because Vitale et al. (1) state that “if the patient [on <5 mg of warfarin] prefers to have vaginal delivery, intravenous heparin over the last two weeks of gestation should be offered as an option,” we assume that they deem this to be a safe alternative. We would suggest that perhaps the emphasis should be reversed from routine cesarean section to routine vaginal delivery.

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