

## LETTERS TO THE EDITOR—BRIEF COMMUNICATION

### The impact of maternal cardioversion on fetal haemodynamics

Dear Editors,

Cardioversion is increasingly used in cardiopulmonary resuscitation and in the treatment of intractable arrhythmia. Although it is not contraindicated in pregnancy, the impact of cardioversion on fetal haemodynamics remains unclear. By measuring umbilical artery flow immediately between each cardioversion, our experience indicates that cardioversion is reassured during pregnancy without compromising fetal haemodynamics.

A 32-year-old woman (G2P1) at 23 5/7 weeks gestation developed nausea, chest discomfort, and shortness of breath while walking. In the emergency room, cardiac examination revealed tachycardia and loud first heart sound—normal second sound without click, rub, murmur, or gallops. Peripheral pulses were shallow. A 12-lead electrocardiogram revealed regular supraventricular tachycardia (SVT) with narrow complexes (180 beats/min) minus delta waves, and blood pressure was 96/60 mm Hg. Complete blood count, electrolytes, cardiac enzymes, and the remainder of the physical examination were unremarkable.

Tracing back to her previous pregnancy, the patient had had three attacks of paroxysmal supraventricular tachycardia (PSVT) at 12, 32, and 33 weeks' gestational age. All episodes were relieved by adenosine, and she had a term, normal delivery with a healthy infant. During this pregnancy, an attack of PSVT at 16 1/7 weeks' gestational age was also completely relieved by adenosine administration.

At this visit, all the management including carotid sinus massage, Valsalva maneuver and three attempts with adenosine failed to prevent PSVT. Electrical cardioversion by synchronized shocks of 50, 100, 200, and 200 J were delivered to convert a normal maternal sinus rhythm at 100 beats/min accompanied by constant monitoring steady fetal heart rate. Doppler ultrasound and systolic/diastolic (S/D) ratio were evaluated immediately before and after cardioversion, both of which showed in normal range (Table 1).

At 29 and 32 weeks gestation, there were two additional episodes of PSVT which were restored to normal rhythm after synchronized shocks of 200 J. Meanwhile, fetal umbilical blood flow was not compromised, as shown in Table 1. Subsequently, the non-stress test and biophysical profile were reactive and showing normal score of 10. These

Table 1

Data of the fetal umbilical blood flow (S/D ratio) before and after cardioversion in different gestational age

Gestational age (weeks)	DC energy (J)	Umbilical blood flow (S/D ratio)	
		Before DC	After DC
16 1/7	None (IV adenosine)	2.7	2.5
23 5/7	50, 100, 200, 200	2.4	2.7
29	200	2.8	2.7
32	200	2.4	2.5

J, joules; S/D, systolic/diastolic; DC, direct current; IV, intravenous.

normal results provide reassurance to us that the fetus can tolerate cardioversion of the mother, and fetal deaths within 1 week of a normal test results are rare.

A preterm baby was delivered without complication at 36 3/7 weeks. No cardiac arrhythmias were exhibited during labor and delivery and there was no recurrence after delivery.

The patient experienced no adverse actions during pregnancy and the infant has normal development at 12 months of age.

Management of PSVT during pregnancy is similar to that for the general population [1]. Treatment of PSVT may also affect the fetus and fetal compromise may occur. For this reason, pharmacological treatment is preferred for those with haemodynamic changes, severe symptoms or sustained arrhythmias.

Clearly, both mother and fetus are at risk when PSVT occurs during pregnancy. There is minimal information on fetus associated with cardioversion. However, only rarely have obstetric cases involving direct current cardioversion been reported. Synchronized direct current cardioversion would not be expected to have significant fetal effects because mammalian fetuses have a high fibrillation threshold and the current density reaching the uterus should be very small [2]. In our case, the patient underwent consecutive and effective electric cardioversion without compromising dynamics of fetal umbilical blood flow.

Doppler ultrasound remains an important diagnostic tool in modern obstetrics [3]. Flow waveforms reflect blood velocity and vascular impedance that may be associated with placental pathophysiology, fetal haemodynamics and, most importantly, adverse pregnancy outcomes including perinatal death. In our case, fetal umbilical blood flow during cardioversion was steady.

The timing of electric cardioversion may be difficult because of potentially conflicting priorities between the mother and fetus, but electric cardioversion generally should not be delayed. Current recommendations state that if the maternal arrhythmia is serious and refractory to other treatments including vagal maneuvers and exhaustive medical therapy, synchronized direct current cardioversion should be performed. Because transient fetal arrhythmia has been reported during cardioversion of pregnant woman, monitoring of fetal heart rate during maternal cardioversion is advisable [4]. Accordingly, our experience indicates herein that electric cardioversion is effective and safe without compromising fetal haemodynamics during all trimesters of pregnancy and this described patient presents classically with normal fetal outcome.

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## A very low transverse uterine incision

Dear Editors,

A transverse incision through the lower uterine segment, which is usually opened through the low uterine segment about 1 cm below the upper margin of the peritoneal reflection, is the most widely used technique for cesarean section. A uterine incision is typically placed relatively high in the lower segment to minimize lateral extension of the incision into adjoining organs [1]. We had

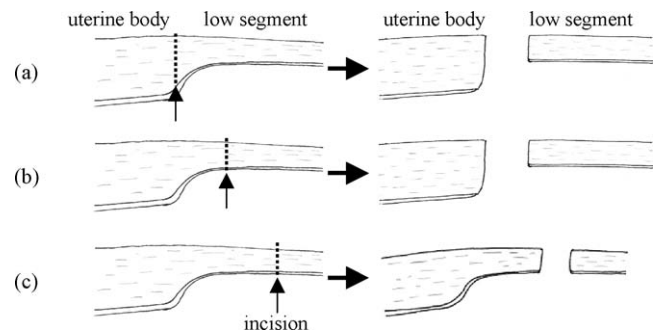


Fig. 1. Differences in thickness of incised surfaces created at three different heights of the low segment.

previously reported three macroscopic types of uterine scars in resected uteri long after cesareans: a thick muscle layer with a shallow groove; lack of a muscle layer replaced by connective tissue; and lack of a muscle layer, and the lower-levelled lower segment transverse incisions offer a better potential for rapid healing than the higher-levelled transverse incisions [2,3]. Endo proposed that differences in thickness occur between upper and lower transverse surgical margins both at a boundary incision with the uterine body and the low segment (Fig. 1a), and at a true low segment apart from the uterine body (Fig. 1b) [4]. In contrast, incision at a low level in the lower segment, which we have performed for over 20 years, engenders no difference in thickness of both margins (Fig. 1c).

A very low transverse uterine incision is placed about 2–3 cm below the upper margin of the peritoneal reflection, which is 1–2 cm lower than that of traditional incision. A total of 3433 very low transverse incisions at our institution between January 1995 and December 2002, caused no adverse perinatal outcome, and there was no case of caesarean hysterectomy due to lateral extension of the incision into adjoining organs. Although the following value is statistically meaningless because of a small population, VBAC was successful in 86.8% of the cases which were tried VBAC in the non-selected sample population. All of the operators have felt that the suturing of the very low transverse incisions was easier than that of traditional transverse incisions. A very low transverse uterine incision might be a viable option during a cesarean delivery as it was previously shown to offer a better potential for rapid healing due to absence in difference in thickness of both margins of the uterine scar.

## References

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