fentanyl, atropine and vecuronium were administered intramuscularly to the fetus. Fetal heart rate was registered by echocardiography. The fetus is highly dependent on maternal body temperature, is unable to thermoregulate, and does not vasoconstrict or shiver in response to decreased core temperature. Induction of general anesthesia, surgical exposure, and hysterotomy can all reduce fetal temperature dramatically. Maintenance of maternal euthermia is essential, which is why we carefully monitored maternal core temperature.[7] The ethical considerations for fetal surgery are analogous to living related organ transplantation, and must not be minimized.[10] Because of the growth in prenatal fetal surgery, anesthetic techniques should be reviewed, as new challenges arrive.

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0959-289X/$ - see front matter

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Antenatal hydration in POTS – could technology help?

Postural orthostatic tachycardia syndrome (POTS) is defined as the presence of orthostatic intolerance symptoms accompanied by an increase in heart rate of at least 30 beats/min (or a rate that exceeds 120 beats/min), within the first 10 minutes of standing or upright tilt. The condition occurs in the absence of other chronic debilitating disorders, prolonged bed rest, or medications that impair vascular or autonomic tone.[1,2]

Postural orthostatic tachycardia syndrome is most commonly seen in women of childbearing age. Approximately 60% of women with POTS find their symptoms improve during pregnancy, but up to 15% say their symptoms stay the same.[3] For some, however, the symptoms may worsen during early pregnancy, especially if a woman suffers from hyperemesis gravidarum.[3]

Initial treatment of patients with POTS is primarily non-pharmacological and is based on increasing fluid and sodium intake, gentle exercise, regular rest periods, and compression stockings. Pharmacological options for non-pregnant patients include midodrine (an alpha-agonist that vasoconstricts), fludrocortisone (to increase blood volume) and ivabradine (to reduce the heart rate by inhibition of pacemaker currents). These medications have little safety data in pregnancy: there is some animal data suggesting harm in the case of ivabradine.[3] Other medications can be tried in resistant non-pregnant cases. In pregnancy, beta-blockade is more commonly used to limit tachycardic symptoms. There is wide experience, including in our clinic, with women using bisoprolol for various cardiac conditions and we monitor fetal growth in these women. In POTS, many women find limited benefit from bisoprolol, however, making non-pharmacological methods even more important.

In our joint obstetrics, cardiology and anaesthetic clinic, we frequently see women struggling with POTS-related symptoms throughout their pregnancy. This year's summer heat wave presented a particular challenge to many and managing water intake, and keeping track of it, can be difficult. So what can be done? We encountered one woman who was confidently

able to quantify her daily fluid intake using a mobile phone application (app) called Plant Nanny. Within this app you can create a plant that keeps you company every day by 'living' in your telephone. In order to keep it alive and help it grow, you must give it water regularly and this is a very simple and pleasant way to encourage someone to drink more fluid and record intake. Similar apps are Daily Water, Hydro Coach, Waterlogged and iHydrate.

We can also recommend such an app for NHS staff. The Association of Anaesthetists has published guidelines 'Fatigue and Anaesthetists' which recommends using electronic devices to facilitate maintaining a diary of activity and sleep.[4] They also suggest avoiding dehydration as one of the coping mechanisms to prevent fatigue. Having an app that encourages us to stay hydrated could be one step forward in taking care of our wellbeing.

Declaration of interest

None.

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Blood pressure measurement in pregnancy

We refer to the article on blood pressure measurement in obese pregnant women in the August edition of IJOA.[1] On page 68, the statement is made that four devices are currently validated for blood pressure measurement in pre-eclampsia. However, the article in the Journal of Hypertension to which the authors refer, also includes as validated the Microlife 3AS1-2 device, which appears to have not been referenced in the article.

The Microlife 3AS1-2 device (now known as the Cradle VSA device, with an inbuilt traffic light system and shock detection) has been validated in accordance with the British Hypertension Society protocol requirements and achieved the International Organisation for Standardization standard for mean difference ± SD (≤5 ± 8 mmHg) in pregnancy, including in pre-eclampsia.[1] Thus, it can be recommended for use in pregnancy and may be particularly useful for accurate detection of blood pressure in high-risk women with pre-eclampsia, where impaired accuracy of other automated devices at higher blood pressures mean that they may underestimate the true blood pressure.[2] It can be used with both small and large cuff sizes.

In addition, the Cradle VSA has been specifically designed for use in low-resource settings, where healthcare workers have limited access to accurate vital signs measuring devices that are suitable for their environment. Over 20 000 such devices have been rolled out in over 20 low- and middle-income countries recently. The device is low cost, easy to use, has low power requirements and can be charged using a standard mobile phone charger. It is also robust and remains very accurate, even at extremes of temperature and humidity.[2] Its integrated traffic light early warning system can identify women who are hypertensive and at increased risk of complications, and who thus require referral and transfer to higher level care.[3]

The device's validation in pregnant women with low blood pressure means that it may also improve the detection of shock, secondary to obstetric haemorrhage or sepsis, particularly in a low-resource setting.[4]

The Cradle VSA device is the cheapest and most accurate blood pressure device available for use in pregnancy and has been recognised as one of the top thirty high impact innovations in global health.[5]

A discussion regarding blood pressure measurement in pregnant women would, therefore, not be complete without mention of this innovative device that has the potential to dramatically improve both maternal and neonatal outcomes around the world.

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