Emergent Caesarean section in parturient with congenital complete atrioventricular block

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Maternal complete atrioventricular block undergoing emergent operative procedure under general anaesthesia should always be managed with intraoperative temporary pacing.

Case report

A 26-year-old gravida 2 parity 1, Indonesian migrant to Malaysia presented for her routine antenatal visit at 36 weeks of pregnancy. Ultrasound examination revealed intrauterine growth retardation with an estimated fetal weight of 2 kg, normal biophysical profile, extended breech lie and oligohydramnios with an amniotic fluid index (AFI) of 5.2 (normal AFI 8–18). She was counselled for elective Caesarean section and admitted for preoperative assessment.

History revealed an uneventful first pregnancy with normal spontaneous vaginal delivery at term aided by a village midwife in 1999. She had no known history of medical illnesses, pharmaceutical prescription, illicit drug use, alcohol consumption or cigarette smoking. Her menstrual history was uneventful and she volunteered the use of oral contraceptives intermittently between 1999 and 2001. Her family history was unremarkable. She did complain of occasional fainting episodes, exertional dyspnoea and palpitations during both pregnancies.

A review of her antenatal shared-care records revealed normal haemoglobin levels, blood pressure readings, blood sugar profile, weight and fundal height progression. However, she had persistent bradycardia of 36–38 bpm throughout her antenatal period. A 12-lead electrocardiogram (ECG) (Figure 1a) showed complete atrioventricular block with narrow QRS complexes and an escape rhythm of 36 bpm. She was then reviewed by the attending cardiologist who performed a transthoracic echocardiography which showed normal left ventricular function with normal chambers and valves aside from trivial tricuspid regurgitation on colour flow mapping. Further blood investigation proved unremarkable (Table 1).

She was then counselled on the possible need for a transvenous temporary pacemaker lead inserted peripartum with a permanent pacemaker implantation in the puerperium in view of her history of fainting episodes, exertional dyspnoea and palpitations. The patient was non-committal regarding the pacemaker, stating the radiation risk to the fetus and that her first delivery was uneventful. Throughout the cardiology consultation she was noted to have increasingly regular and stronger contractions. A vaginal examination then revealed an effaced cervix, 4 cm ostium and −2 station with breech presentation.

She was then planned for an emergency Caesarean section, connected with transcutaneous pacing as a general precaution. The gel pads were strapped by an extra layer of Tagaderm™ (3M, St Paul, MN, USA) transparent dressing for greater support and to maintain sterility of the operating window (Figure 2).Ventricular capture was reliably demonstrated at 10 mA and she was paced at 50 bpm (Figure 1b).

The delivery proceeded uneventfully under general anaesthesia. However, intraoperative blood loss of 400 mL resulted in hypotension and a momentary loss of ventricular capture requiring the insertion of a transvenous temporary pacemaker lead immediately postpartum with good results. She was then observed in the coronary care unit

Figure 1
(a) ECG showing complete atrioventricular block, narrow QRS with ventricular escape rhythm of 36 bpm; (b) ECG showing ventricular pacing at 60 bpm following transvenous endocardial pacemaker insertion postoperatively

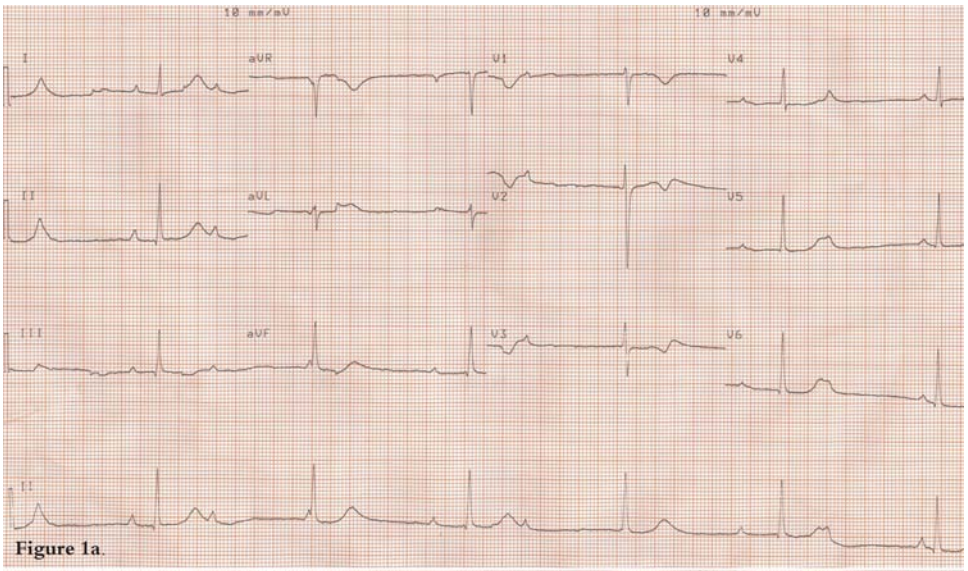

Figure 1a.

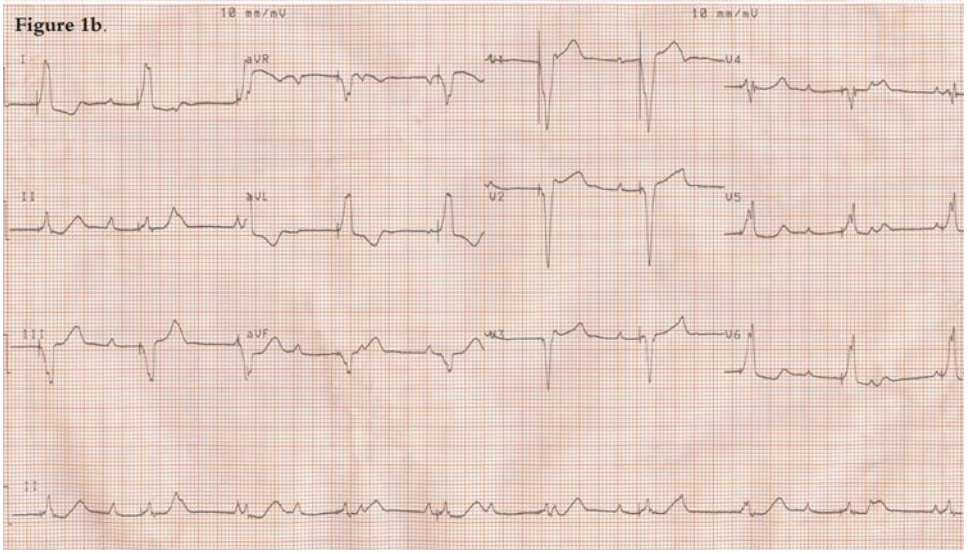

Figure 1b.

for 48 h, the temporary pacemaker was removed at the end of the period, and she was eventually discharged well and asymptomatic.

Discussion

The prevalence of bradyarrhythmia in women of reproductive age is 1/20,000 and a significant majority are diagnosed prior to pregnancy.[1] These women will usually have had pre-pregnancy counselling, close antenatal monitoring, temporary/permanent pacemaker implantation and, thus, favourable outcomes.[2,3] Maternal complete atrioventricular blocks have been reported as early as the 1950s but the rarity of such cases have precluded the formulation of comprehensive guidelines on their management.[4]

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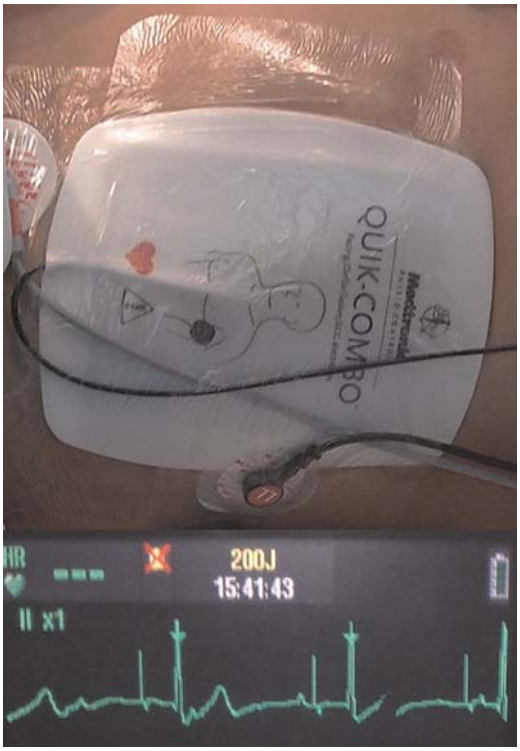
Table 1
Blood investigations performed during the preoperative assessment

Full blood count		*Coagulation profile*	
Haemoglobin	12.9 g/dL	APTT	25.8 Secs
White cell count	10.9 x 10^9	INR	0.9
Mean corpuscular volume	86 fL	PT	11.1 Secs
Mean corpuscular haemoglobin	27.9 PG		
Platelet	291 x 10^9	**Thyroid function test**	
Electrolytes		TSH	0.59 mU/mL
Sodium	142 mmol/L	Free T_4	19.00 pmol/L
Potassium	4.0 mmol/L	Free T_3	4.34 pmol/L
Calcium	2.5 mmol/L		
Magnesium	0.87 mmol/L	**Connective tissue disease screen**	
Creatinine	64.0 μmol/L	Antinuclear antibody (ANA)	Not detectable
Liver function test		Rheumatoid factor	Negative
Albumin	41 g/L	ESR	13 mm/hr
Total protein	70 g/L		
Bilirubin	10 μmol/L		
Alanine transaminase (ALT)	7 U/L		
Alkaline phosphatase (ALP)	69 U/L		

APTT – activated partial thromboplastin time, INR – international normalization ratio, PT – prothrombin time, TSH – thyroid stimulating hormone, ESR – erythrocyte sedimentation rate

Figure 2
Picture showing gel pads strapped by multiple layers of transparent dressing for greater support and preservation of the sterile window. The figure below shows the cardiac monitor display during the procedure



Complete atrioventricular block is a rare and serious complication in pregnancy.[1] Management has ranged from expectant management to permanent pacemaker insertion.[2] The rarity of such cases has precluded the formulation of clear guidelines and several case reports have commented on this paucity and formulated algorithms for assessing patients with complete atrioventricular block leading to indications for pacemaker insertion.[5,6]

Aetiologically, complete atrioventricular block can be congenital or acquired. In patients with complete atrioventricular block, the escape QRS complex duration depends on the site of the escape rhythm pacemaker. A narrow QRS denotes an origin above the Bundle of His and the converse is true in wide QRS complete atrioventricular block. Patients with AV nodal blockade usually have an escape rhythm from a junctional pacemaker of around 45–60 bpm, are usually asymptomatic, haemodynamically stable with a normal heart rate response to exercise and atropine.[6] These patients with chronotropic responsiveness do not usually require permanent pacemaker insertion and can be managed expectantly during the peripartum period.[2]

In our patient, the uneventful first delivery, generally asymptomatic nature and normal echocardiography pointed to the fact that she may be chronotropically responsive and thus may not require a permanent pacemaker. Conversely, she did complain of episodes of fainting, exertional dyspnoea and palpitations. These symptoms may be present in any normal pregnancy and are relatively non-specific, but their presence in her

without any prior documentation of chronotropic responsiveness merited erring on the side of caution with at least a peripartum transvenous temporary pacemaker especially in a semi-emergent scenario such as ours.[7,8]

Patients requiring open heart surgery for congenital heart diseases are increasing and these patients with complete atrioventricular block who become pregnant should be counselled for permanent pacemaker insertion prior to pregnancy or labour.[5] Permanent pacemaker insertion prior to labour will afford a safe delivery in the majority of cases.[5,6] Patients who present with previously unrecorded complete atrioventricular block should be assessed for valvular heart diseases, connective tissue diseases, myocarditis and sarcoidosis and their work-up should include assessment for chronotropic responsiveness. This can be achieved via simple treadmill stress test before and within the first trimester of pregnancy. Patients in later stages of pregnancy, with narrow-complex complete atrioventricular block could be assessed with atropine.[6]

Unresponsive patients could then be planned for permanent pacemaker insertion within the first and second trimesters of pregnancy. Proven chronotropic responsiveness will preclude permanent pacemaker implantation but may not negate prophylactic peripartum temporary pacemaker cover. Other measures that could be adopted include 24-hour rhythm monitoring, effective analgesia, shortening the second phase of labour and cardiology presence during delivery and follow-up postpartum. Emergent patients who present in labour with maternal complete atrioventricular block should always be counselled for a transvenous temporary pacemaker and should that be refused, with a transcutaneous temporary pacemaker during labour and in the immediate puerperium. A full work-up should follow with a view towards permanent pacemaker implantation postpartum.

In conclusion, medical emergencies continue to challenge our management principles and implementation especially with the piquant addition of patient mediated factors. Known complete atrioventricular block patients with pregnancy should always be counselled and worked up for permanent pacemakers. Newly-diagnosed patients should always be worked up for secondary aetiologies and chronotropic responsiveness. Emergent cases should always be covered with a prophylactic temporary pacemaker peripartum with subsequent postpartum cardiac work-up.

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