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Images in Congenital Heart Disease

Artefactual atrial flutter

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A 17-YEAR-OLD FEMALE WAS ADMITTED TO THE paediatric intensive care unit with hypotension and systemic inflammatory response syndrome. The patient had progressive failure of multiple systems of organs, including progressive renal failure and fluid overload. She was subsequently started on continuous venovenous haemofiltration using a Prisma system (GAMBRO Healthcare;

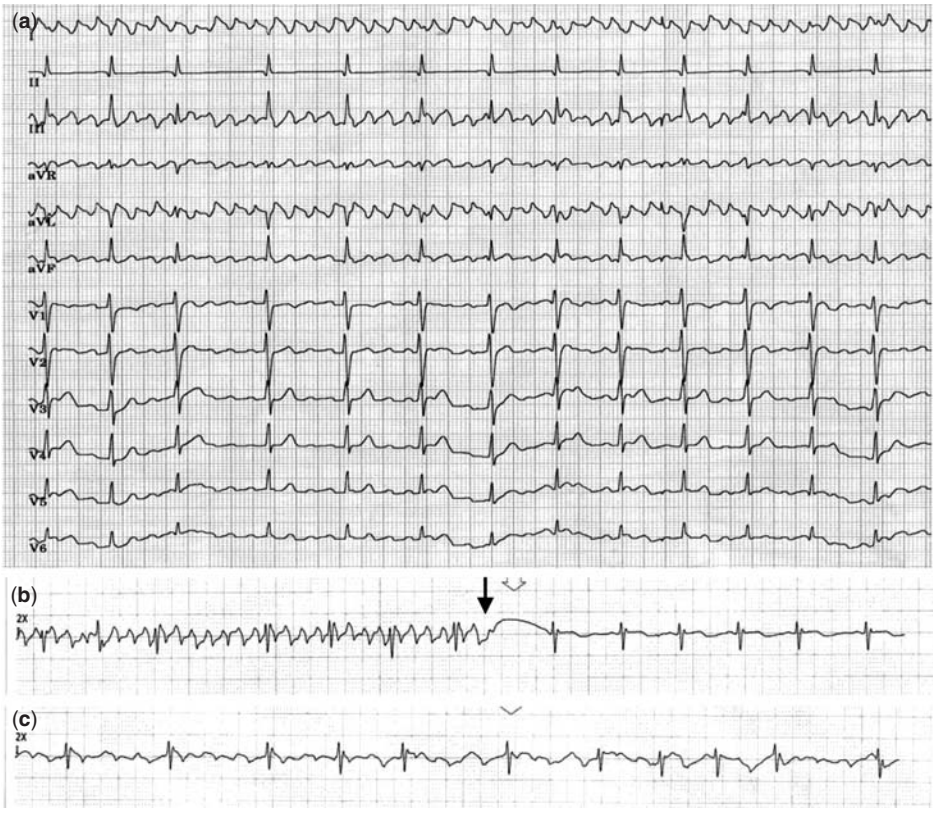

Figure 1.
*(**a**) Initial 12-lead electrocardiogram during haemofiltration. (**b**) Rhythm strip at time haemofiltration was turned off (black arrow). (**c**) Rhythm strip with flow rate of filtration system decreased by half.*

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Lakewood, CO, USA). Concurrent with the initiation of haemofiltration, the patient developed an apparent atrial arrhythmia, with saw-toothed P waves on the electrocardiogram, the tracings being suggestive of atrial flutter with variable atrioventricular conduction (Fig. 1a). The ventricular rate ranged from 70 to 80 beats per minute.

Subsequently, it was observed that, when the haemofiltration system was turned off, the flutter waves immediately resolved (Fig. 1b – black arrow). In addition, when the rate of flow of the filtration system was decreased by half, the cycle length of the flutter waves doubled (Fig. 1c). An echocardiogram, which was performed during the time of the presumed arrhythmia, demonstrated synchronous one-to-one atrioventricular contractions. The diagnosis of artefactual atrial flutter was confirmed.

The presumed aetiology of the artefact is electrical interference caused by static electricity, which is generated by the rotational movement of the blood pump.[1] The involvement of the pump is confirmed by the fact that alteration of its rate of rotation results in alteration of the cycle length of the purported flutter wave.

Electrocardiographic artefacts may mimic serious arrhythmias and, if not recognized as such, may lead to unnecessary and potentially harmful attempts at therapy.

Reference

1. Graansma C, Liu TT, Tobe SW. A simple solution to pseudoarrhythmia during continuous renal replacement therapy. CANNT J 2004; 14: 24–25.

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