

# ANAESTHETIC MANAGEMENT OF A CHILD WITH AN EPICARDIAL PACEMAKER UNDERGOING LEFT EXTENDED HEPATECTOMY: A CASE REPORT

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### **Description**

A 2-year-old/10 kg male child, diagnosed with Hepatoblastoma (PRETEXT stage III), having a congenital complete atrioventricular block (CCAVB) with an epicardial pacemaker (VVI mode, set heart rate 100/min) and a chemoport in right internal jugular vein (IJV) in situ, presented for left extended hepatectomy. The patient's pacemaker battery was fixed in the left hemithoracic cavity above the diaphragm, only a few centimetres away from the site of surgical interest, making electromagnetic interference (EMI) a significant concern. There was also a possibility of fracture of pacing leads due to stretch on these following retraction of the diaphragm for surgical exposure. To mitigate any intraoperative pacemaker malfunction, fluoroscopy-guided transvenous pacing wire placement through left IJV was planned (Plan A), but abandoned after 2 attempts, as the guidewire entered the right IJV instead of the right atrium. Hence, we conducted the surgery after applying paediatric transcutaneous pacing paddles on the patient's chest (Plan B). Surgery was conducted under general anaesthesia and epidural analgesia after switching the pacemaker from VVI to VOO mode with a set heart rate (HR) of 135/min [1]. Left Radial artery was cannulated for invasive haemodynamic monitoring. Bipolar cautery and cavitron ultrasonic surgical aspirator (CUSA) were used to minimise EMI. Given the paucity of advanced cardiac output (CO) monitoring devices for small children, we used visual analysis of arterial pulse contour along with changes in the invasive blood pressure and end-tidal carbon dioxide (EtCO<sub>2</sub>), to guide fluid resuscitation [2, 3, 4]. Blood loss was 1400mL, which was replaced using 2000 ml crystalloids, 500 ml colloid and 600 ml packed red cells with 400 ml fresh frozen plasma. The child required low dose Noradrenaline infusion for brief periods during surgery, which was tapered off at the end of the procedure. The trachea was extubated after adequate reversal of neuromuscular blockade. Pacemaker was switched to VVI mode with HR 130/min immediately post surgery. The child was shifted to ward after 48 hours of postoperative monitoring in Post-anaesthesia Care Unit. After cardiology review, the pacemaker rate was subsequently reduced to the preoperative rate of 100/min, after an uneventful in-hospital course.

### **Discussion**

Challenges in management of this case were: (1) A high possibility of pacemaker malfunction/failure. Hence, alternative measures to take-over cardiac pacing were planned. Measures were also taken to reduce EMI; (2) CO monitoring during management of massive blood loss. CO monitoring using PiCCO is among the very few of the definitive haemodynamic monitoring modalities in small children, unlike many others available for adults [4]. Assessment of clinical signs along with EtCO<sub>2</sub> as markers of cardiac output gave important inputs for haemodynamic

monitoring. Anticipation and appropriate preparation with continuous vigilance were key factors in successful perioperative management.

#### References

1. Gillis A, Russo A, Ellenbogen K, et al. HRS/ACCF Expert Consensus Statement on Pacemaker Device and Mode Selection. *J Am Coll Cardiol*. 2012 Aug, 60 (7) 682–703.
2. Trieu CT, Williams TM, Cannesson M, Marijic J. Babies and Children at Last: Pediatric Cardiac Output Monitoring in the Twenty-first Century. *Anesthesiology*. 2019 May;130(5):671-673.
3. Riley, C. M. (2017, March 18). Continuous capnography in pediatric intensive care. *Critical Care Nursing Clinics*. Retrieved February 13, 2023, from [https://www.ccnursing.theclinics.com/article/S0899-5885\(17\)30011-4/pdf](https://www.ccnursing.theclinics.com/article/S0899-5885(17)30011-4/pdf)
4. Singh, Y., Villaescusa, J.U., da Cruz, E.M. et al. Recommendations for hemodynamic monitoring for critically ill children—expert consensus statement issued by the cardiovascular dynamics section of the European Society of Paediatric and Neonatal Intensive Care (ESPNIC). *Crit Care* 24, 620 (2020).