



# Feasibility of Intraoperative Trans-Thoracic Echocardiography for Goal Directed Fluid and Hemodynamic Therapy in Children and Postoperative Outcome

Claudine Kumba\*

Department of Pediatric Anesthesia and Critical Care, Necker Enfants Malades University Hospital, France

**\*Corresponding author:** Dr. Claudine Kumba, Department of Pediatric Anesthesia and Critical Care, Necker Enfants Malades University Hospital, Assistance Publique Hôpitaux de Paris, APHP, University of Paris, Paris, 149 Rue de Sèvres 75015 Paris, France, Tel No: +33144494172; Email: claudine.kumba@gmail.com

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## Opinion

Recently, several trial protocols with trans-thoracic echocardiography to guide intraoperative goal directed fluid and hemodynamic therapy (GDFHT) in pediatric surgical settings have been described [1-8]. Questions have been asked concerning the feasibility of intraoperative trans-thoracic echocardiography (TTE) due to the surgical field. It is of common knowledge that any technique has its limits. One should have in mind that one limits of trans-thoracic echocardiography is the patient's echogenicity. The other limit is the access to the thorax for which the apical 5 chamber view and the parasternal longitudinal view will be necessary to register the parameters. Another limiting factor is the familiarity with trans-thoracic technique of the medical team. There are continuous medical education (CME) programs with echocardiography organized which are accessible.

Patient's installation and positioning is an important issue to perform TTE. Thus interventions with limited access to the thorax precisely the apex region can be limiting factors. Nevertheless one should bear in mind that TTE remains an accessible and non-invasive tool for hemodynamics. In critical ill adult patients, this tool is widely utilized to monitor hemodynamics and for diagnosis [9]. In children, TTE is widely used for diagnosis and for interventional techniques. TTE is feasible intraoperatively to monitor hemodynamics in children taking into account that echogenicity, access to the thorax and familiarity with TTE technique can be limiting

factors. Besides these mentioned limits TTE is feasible intraoperatively in children.

Other remarks which have been raised concern the feasibility of trans-esophageal echocardiography (TEE) in place of TTE intraoperatively to monitor hemodynamics in non-cardiac surgical settings. TEE remains more invasive (semi invasive) than TTE. TEE has its utility in cardiac surgery where it can bring important information before and after surgical repair. TEE can also be useful after weaning from cardiopulmonary bypass to monitor hemodynamics before the thorax is closed surgically. It has been evidenced that when TEE was realized systematically after cardiac surgical repair, length of hospital stay was reduced [10]. TEE can help in situations where TTE is not feasible or when TTE does not help but I don't think that TEE should be utilized systematically intraoperatively to monitor hemodynamics in non-cardiac surgical patients because it remains a more invasive technique than TTE. So in situations where echocardiography can be realized and feasible the first choice should be TTE. If TTE is not feasible or realizable, TEE can be an alternative bearing in mind that it's a semi-invasive technique which can bring answers in situations where TTE cannot be realized and that there are contraindications to TEE.

Before concluding that a technique is not realizable, evidence should be given for that. Several studies in pediatric surgical settings have proven trans-thoracic echocardiographic aortic

peak velocity variation to predict fluid responsiveness. Trans-thoracic echocardiography was realizable in these settings [11-13].

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