

World Congress on

RADIOLOGY AND ONCOLOGY

October 19-20, 2017 | New York, USA

Sonographic measurement of inferior vena cava as a predictor of hypovolemia in children undergoing major operation

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Background: An effective, real-time, non-invasive and easy method for assessment of intravascular volume status during the periods of intraoperative bleeding remains a dream for most anesthesiologists.

Objective: The objective of this study is to investigate, whether sonographic measurements of IVC diameters can be helpful in predicting the occurrence of intra-operative hypovolemia in children undergoing major operations or not?

Study design: Prospective, randomized study. 50 patients aged less than 12 years who are going to have operations with expected blood loss, more than 10% of total blood volume (TBV) were included. Exclusion criteria were any patient with respiratory, hepatic or renal dysfunction, haemato-oncological disorders and abdominal surgery due lack of appropriate probe. Operational course was categorized into two stages, stage I in which expected blood loss was $\leq 10\%$ of TBV and the allowed fluid transfusion was only the maintenance transfusion and stage II, in which the expected blood loss was $>10\%$ of TBV and the patient was given replacement transfusion with either crystalloids, colloids or blood products at the direction of anesthesia provider. Heart rate, noninvasive blood pressure was contentiously monitored. Maximum and minimum IVC diameter (IVCmax, IVCmin) and collapsibility index were measured before, immediately after induction and at least every 15 minutes according to the degree of blood loss. Central venous line was inserted after induction of anesthesia and CVP was measured every at least 15 minutes according to blood loss.

Results: Data was analyzed in relation to the expected blood loss. Correlation, regression analysis and measuring the area under ROC curve reveals a significant correlation between IVC diameter, collapsibility index and degree of hypovolemia especially in stage I as there is no confounding effect of fluid transfusion that occur in stage II collapsibility index was more significant. CVP was poorly correlated to hypovolemia through both stages.

Conclusion: Sonographic measurement of IVC diameters was better and earlier predictor of hypovolemia and fluid transfusio.

Biography

He is Prof. Ahmed aly aldaba prof. of anesthesia & surgical I C U in Tanta Univ. Egypt , I published about 20 researches in specialised journals. I am expert in pediatric anesth. , geriatric anesth. obstetric anesth. , anesth.for ENT surg. , anesth for vascular surg. , anesth. for labaroscobe , anesth.for urology & orthopedic surg. Also i have special experience for ultrasonic guided nerve block. Lastly i am expert in anesth. with induced hypotension.

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