

The use of hTEE™ to guide hemodynamic management in a patient undergoing scoliosis surgery

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Background

Major orthopaedic surgery is frequently associated with substantial blood loss, transfusion, and considerable fluid shifts. Maintenance of an adequate cardiac preload is therefore one of the most prominent objectives in the hemodynamic management of patients undergoing major orthopedic surgery, in particular as optimization of intraoperative hemodynamics has been repeatedly demonstrated to improve patients' outcome, economize health-care related resources and reduce overall hospital costs.

In high-risk surgery, the use of transesophageal echocardiography (TEE) for intraoperative monitoring has become increasingly popular. However, in scoliosis surgery requiring prone positioning, TEE is only infrequently employed due to lack of direct control of the probe and the associated potential risks, such as oropharyngeal and laryngeal trauma or loss of artificial airway.

We report here on the use of a miniaturized TEE probe (the ImaCor hTEE™ probe, designed and cleared by the FDA to remain indwelling up to 72 hours) to guide hemodynamic therapy in a patient undergoing scoliosis surgery in prone position.

Case

A 67 years old female patient was scheduled for posterior correction of degenerative scoliosis reaching from the third thoracic segment down to the iliac bone.

Her medical history was devoid of any cardiac risk factors. However, her preoperative electrocardiogram showed signs of an older inferior myocardial infarction. The preoperative echocardiography was inconspicuous. After induction of anesthesia, placement of an arterial and central venous line, the hTEE™ probe was placed without any problems together with a gastric tube, and the patient was brought into the prone position.

Throughout the whole surgical procedure lasting approximately 12 hours, the hTEE™ probe remained safely in place. No complications associated with the use of the probe occurred. We could obtain high-quality image planes in the transgastric short-axis view and the mid-esophageal four-chamber view, whereas the superior caval vein view was of minor quality. Several episodes of intraoperative hypotension could be reliably attributed to hypovolemia by using hTEE™ and rapidly corrected with volume expansion.

Discussion

In patients undergoing high-risk surgery, intraoperative hypotension is most frequently due to hypovolemia which has to be aggressively corrected with volume expansion. However, in patients at an increased cardiac risk, hypotension can also occur subsequent to an acute impairment of myocardial performance in which volume expansion can have deleterious effects.

Our case illustrates the use of hTEE™ to aid in diagnosing the correct cause of intraoperative hypotension. Due to its miniaturization, the hTEE™ could be safely used in prone position.