

GOAL DIRECTED THERAPY – EXPERIENCE AT A TERTIARY CARE CENTRE

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45

The purpose of haemodynamic monitoring is to assess circulatory performance to determine if cardiac output is consistent with maintaining tissue oxygen demand, and if not, to determine what components of the haemodynamic profile need to be adjusted to re-establish the consumption-demand balance and achieve the optimal cardiac output and mixed venous O₂ reserve.¹ Importantly, haemodynamic monitoring must be considered within the context of a proven medical therapy, success of which is dependent on the clinical condition, pathophysiological state, and ability to reverse the identified disease process. No device, no matter how accurate or insightful its data will improve patient outcomes unless its couple to a treatment which itself will improve outcome.^{2,3}

Goal directed therapy, often defined as “setting a haemodynamic goal and fitting the patient to the goal,” has been the subject of numerous reviews and commentaries. I prefer the concept “haemodynamic optimisation” whilst arguably similar in principle is subtly different and can be defined as “looking at the patient and fitting the goal to the patient who is having a specific operation.”

The presentation will describe haemodynamic optimisation strategies that are being utilised at Austin Hospital, Melbourne, Australia, with a focus on our major hepatobiliary surgery. Currently our hospital provides anaesthesia services for ~50 liver transplants per year. Being one of the largest hepatobiliary units in Australia, each year we also provide services for ~50 major liver resections and over 50 major pancreatic resections including vascular reconstruction surgery.

In this context, haemodynamic optimisation strategies are discussed to assist colleagues or other institutions who may be developing haemodynamic optimisation strategies for similar surgical procedures for the first time, or who are interested in different perspectives on haemodynamic monitoring. This is not intended to be a dogmatic approach to the topic, but rather to suggest haemodynamic optimisation models to evaluate the effectiveness of care, improve clinician practices, and reduce the risk of major adverse events. In the absence of definitive guidelines for these operations, an approach to haemodynamic optimisation in our hospital is presented.

Key concepts discussed in the presentation include –

1. There is no such thing as normal cardiac output. Cardiac output is either adequate to meet the metabolic demands or inadequate to meet the metabolic demands
2. Hypotension is always pathological and should not be accepted or tolerated during any anaesthetic. Intraoperative hypotension is a strong and highly significant predictor for mortality⁴
3. Normotension however does *not* necessarily mean that the patient is “healthy”
4. Resuscitation of mean arterial pressure does not always restore microcirculation, ie pressure is *not* flow. Although the presence of arterial hypotension is clearly an ominous sign indicating a high severity of illness, arterial blood pressure alone is an insensitive indicator of tissue hypoperfusion^{5,6}
5. CVP should not be used to make clinical decisions regarding fluid management. Central venous pressure does *not* predict fluid responsiveness^{7,8}

There is consensus that advanced haemodynamic monitoring is better than no monitoring for high risk patients undergoing prolonged and complex surgery. Whilst haemodynamic goals are important, the best haemodynamic goal and how to achieve these goals is still unknown. Approaching consensus that haemodynamic protocols (reproducible care practices) are better than no protocols is important in improving patient outcomes.

There is also general consensus that all the commercially available haemodynamic devices (Swan-Ganz, FloTrac, LidCo, Pulsion, Deltex, etc) are clinically acceptable in most conditions. There are still some questions regarding their use in highly unstable patients, after vasoactive drugs and about comparing trends. It must be recognised



that all these devices have independent values for stroke volume variation and trending stroke volume and cardiac output, and outcome studies are still necessary to show the true value.

We therefore are currently exploring different haemodynamic algorithms for patients undergoing major hepatobiliary surgery at our institution. It is important to appreciate that haemodynamic monitoring must be considered within the context of each operation, success of which is dependent on understanding the operation itself, providing the surgeon with optimal operating conditions, and tailoring the haemodynamic goals to the patient during each stage of the surgery. For example, the haemodynamic goals for a patients undergoing major hepatic resection are very different to the haemodynamic goals for patients undergoing pancreaticoduodenectomy (Whipple’s Procedure). During each stage of the surgery, there are specific and tailored haemodynamic goals aimed to enhance patient safety whilst providing the surgeon with favourable operating conditions. The surgical and anaesthesia considerations for major liver resection are summarized in Figure 1.

These concepts will be detailed in the presentation.

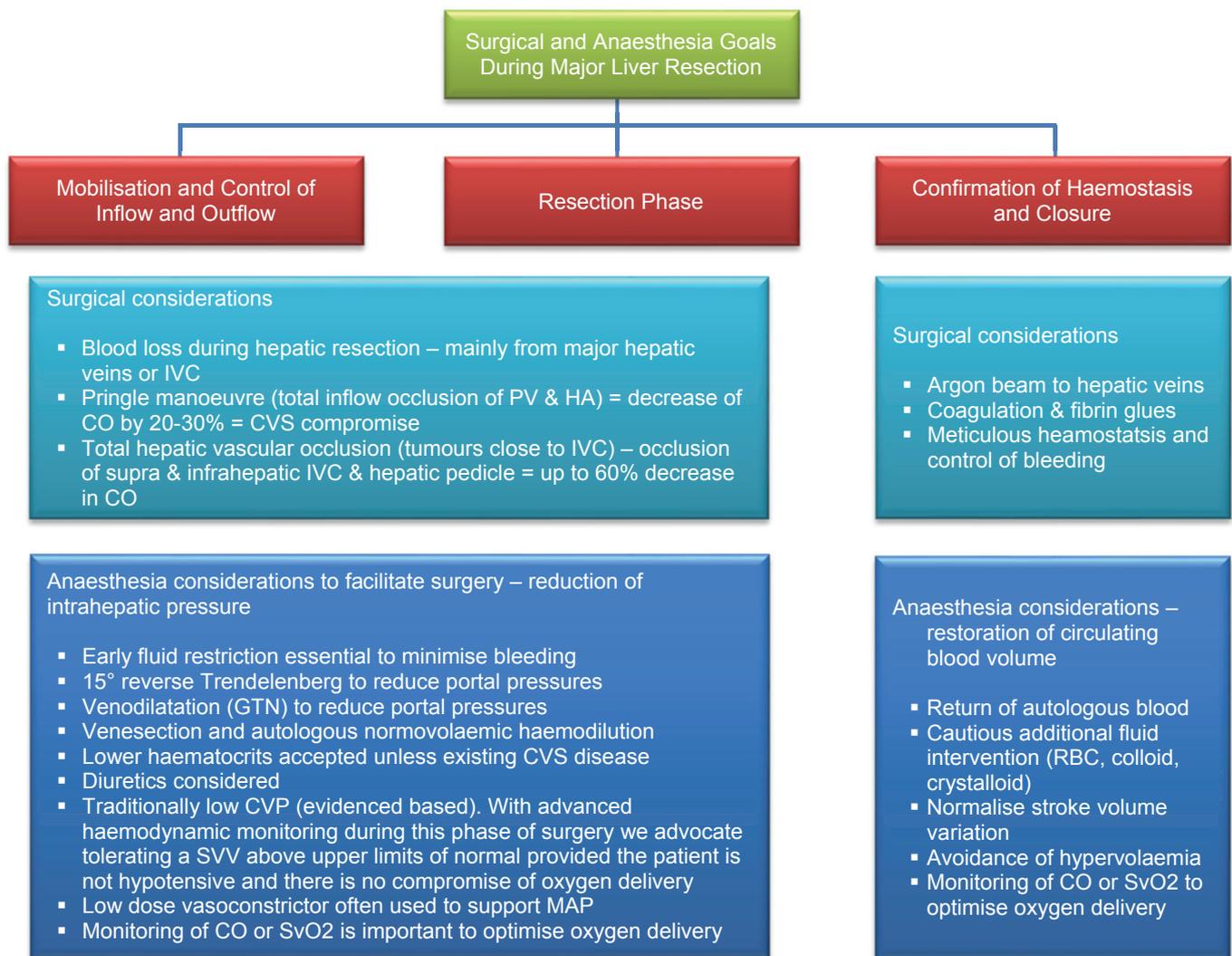


Figure 1. Important surgical and anaesthesia considerations during major liver resection

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