

Interactive Clinical Session

Challenges for Clinicians 2010

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Scenario:

A 56 yr M is scheduled for a hepatic resection. Approximately 1 month ago, a hepatic mass was detected by CT scan obtained during an ER visit for abdominal pain. Fine needle biopsy was indeterminate but the lesion was sufficiently unusual-appearing on CT that laparoscopic excision was recommended.

He has a history of peripheral vascular disease, TIA 2 years ago, mildly reduced contractility (EF = 30%), hypertension with baseline BP 150/95, Type II diabetes, and mild renal insufficiency (Cr = 1.4). He takes enalapril 10mgPOqd, metoprolol 50mg PO QD, Lasix 20mg POqd, Imdur (30mgPO qd) and metformin (500mg PO BID). He has no positional dyspnea, but is SOB after 1 flight stairs. He weighs 82kg and is 5' 11" tall.

On the morning of surgery, he reports no shortness of breath or chest pain. BP 105/60, HR 80, SpO₂ = 94% on RA. On the advice of his surgeon, he noted not taking his metoprolol, metformin, or lasix, but did take his imdur and enalapril. He is anxious to have his surgery. The surgeon requests that you limit fluids if possible to reduce hepatic venous congestion during the procedure

1. Would you cancel this case because the patient took his enalapril? (yes/no)

This patient is on enalapril and took it this morning. His immediate preoperative blood pressure is considerably lower than his reported baseline, however, and he has had a TIA in the past. In light of the possibility of malignancy, both he and his surgeon are anxious to proceed with surgery.

Literature:

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You decide to proceed with the case. Induction of anesthesia, muscle relaxation (rocuronium), intubation, and placement of a second IV were uncomplicated. Surgery begins and laparoscopic ports are placed. With peritoneal insufflation, the blood pressure falls to 78/38 with HR 86. The BIS monitor reads 36 and End Tidal Anesthetic Gas (ETAG) = 0.4 MAC (sevoflurane). U/O over the last hour = 15cc.

2. How would you address this blood pressure?

- a. Reduce ETAG
- b. Give fluid
- c. Start a vasoconstrictor

Although blood pressure is low, ETAG and BIS are low as well. While lowering ETAG may increase the risk of awareness, volume administration may worsen venous congestion and/or oxygenation. Starting a vasoconstrictor, however, may worsen end organ perfusion. In addition, your surgeon is requesting fluid restriction to limit portal congestion and improve outcome

Literature:

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2. McArdle GT, McAuley DF, McKinley A, Blair P, Hoper M, Harkin DW. Preliminary results of a prospective randomized trial of restrictive versus standard fluid regime in elective open abdominal aortic aneurysm repair. *Ann Surg*. 2009 Jul;250(1):28-34
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4. Kheterpal S, Tremper KK, Englesbe MJ, O'Reilly M, Shanks AM, Fetterman DM, Rosenberg AL, Swartz RD. Predictors of postoperative acute renal failure after noncardiac surgery in patients with previously normal renal function. *Anesthesiology*. 2007 Dec;107(6):892-902

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You decide to give a 500cc IV fluid bolus. BP improves slightly to 83/42. HR and U/O are unchanged. The surgeon begins laparoscopic hepatic dissection and now requests that the patient be placed in the reverse Trendelenburg position to facilitate exposure and reduce portal congestion. You tilt the table 20 degrees. Blood pressure remains unchanged (83/42, mean = 56 mmHg)

3. Would you increase BP during the period that this patient is in reverse Trendelenburg?

Mean pressure has not changed. But now the head is significantly above the BP cuff. In recent case studies, patients positioned in the beach chair position have sustained neurologic injury despite apparently adequate mean blood pressure. Administration of a vasoconstrictor may worsen end organ perfusion.

Literature

1. Friedman DJ, Parnes NZ, Zimmer Z, Higgins LD, Warner JJ. Prevalence of cerebrovascular events during shoulder surgery and association with patient position. *Orthopedics*. 2009 Apr;32(4)
2. Bhatti MT, Enneking FK. Visual loss and ophthalmoplegia after shoulder surgery. *Anesth Analg*. 2003 Mar;96(3):899-902
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You decide to begin a neosynephrine infusion at 0.3 mcg/kg/min to support blood pressure. BP increases to 90/45. but urine output is 5 cc and dark. The surgeon struggles

with the dissection, and eventually is forced to enlarge his incision. You give vecuronium to facilitate the procedure. EBL is 250cc but 100 cc of irrigation has been used. The surgeon notes continued congestion of the portal veins and asks about urine output. You discuss the situation and he recommends lasix.

4. Would you give lasix to this patient?

While the portal system appears congested, low urine output in this patient may signify decreased cardiac output and hypovolemia. Multiple large scale studies, however, have demonstrated that intraoperative low urine output does not predict postoperative renal failure. No study has shown that treating low intraoperative urine output improves outcome. In this case, although giving lasix may facilitate hepatic dissection, it may also worsen renal perfusion.

Literature:

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You agree to give lasix. After 20 mg IV, urine output over the next hour is 300cc. The surgeon describes increased visibility, over the next 90 minutes completes the resection, and begins closing. He notes that the fascia is extremely thin and asks you to minimize postoperative nausea and vomiting if possible

5. Would you reverse the muscle relaxation?

120 minutes have passed since you gave muscle relaxation and 4 twitches are present on nerve stimulator electrodes attached to the face. While reversal may worsen nausea,

recent studies suggest that even mild degrees of residual neuromuscular blockade are associated with postoperative respiratory complications.

Literature:

1. Gan TJ. Risk factors for postoperative nausea and vomiting. *Anesth Analg.* 2006 Jun;102(6):1884-98
2. Murphy GS, Szokol JW, Marymont JH, Greenberg SB, Avram MJ, Vender JS, Nisman M. Intraoperative acceleromyographic monitoring reduces the risk of residual neuromuscular blockade and adverse respiratory events in the postanesthesia care unit. *Anesthesiology.* 2008 Sep;109(3):389-98
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You decide to give reversal. The patient is extubated successfully and goes to the PACU. The liver lesion is a benign hamartoma. She leaves the hospital on POD #5. Another job well done!