New Media

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More on Internet Medical Discussion Groups:

A sample discussion thread on anesthesia for liver transplantation

We have already discussed Internet Medical Discussion Groups (IMDGs) earlier in this column (March 1999). Essentially, IMDGs are a variety of people who converse electronically on a medical topic, such as pain management or anesthesiology. The best known IMDG in anesthesiology resides at Yale University, at the GASNet Server at <http://gasnet.med.yale.edu> where the raw archives for over five years of discussion on hundreds of anesthesia issues sits awaiting scholarly commentary by some future anesthesiologist/anthropologist.

Provided below is an edited and shortened commentary sequence ("thread") in response to a posting made on the GASNet discussion forum following a coagulopathic liver transplant case for which I once provided anesthesia care. Note that the authors' names have been removed for privacy purposes.

MEGA TRANSFUSION FOR LIVER TRANSPLANTATION

Two weeks ago my resident and I (with help from nurses and others) gave the following blood products in the on-going resuscitation of a patient undergoing an eleven hour liver transplant:

- 142 units of packed cells
- 61 units of fresh frozen plasma
- 15 litres of 5% albumin

As well, cryoprecipitate and platelets were given, along with about 25 liters of crystalloid. We had seven *ivs*, of which four were warmed. All blood bags were pressurized to 400 mmHg with a wrap-around bag system. The hemoglobin concentration on arrival (alive!) in the surgical ICU was 11.3 g-dl⁻¹.

This may be something of a record. Does anyone know of similar stories either from the literature or from personal experience?

Reply 1

You were just getting warmed up! I assisted in getting 500 donor units in the room for one patient, and have been told by a reliable source that over 1000 units have been used in a single case. Both of these were some years ago, and it is my impression that the overall situation is now much improved. The case I knew of did not survive to leave the operating room. It might be hard to get data on the records, as those who know about them might not want to confess. I am now somewhat out of touch with this, as I have not done livers for the past 11.5 years.

Reply 2

Bravo! I have given 195 packed red cells for a liver transplant, but we were using a rapid infusion system. The reservoir filter got clogged and we had to replace it during ongoing blood loss. Not fun. I guess you now have powerfully developed forearms from pumping up those bags.

Reply 3

My experience with these mega transfusions for liver transplants (> 100 units) is that although they usually arrive in the ICU, they do not leave the hospital alive. I wonder if we shouldn't have the surgeons pack the wound after a fixed amount of blood is given, (and the liver seems to be adequately sutured in place), and then return the patient to the OR on the next day if the patient is still alive. The amount of blood wasted seems a shame.

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Reply 4

Your message prompted several questions, which I hope will stimulate discussion: 1) is the patient still alive?; 2) if not, was the expenditure of such expensive resources worth it?; 3) if so, does it appear s/he's going to make it?; 4) is liver transplantation something we should be doing, something we should be investing such resources in? Thoughts, everyone.

Reply 5 - Response to Replies 1-4

MORE ON MEGATRANSFUSIONS IN LIVER TRANSPLANTATION

In response to discussion on the above topic, I am providing the additional information about my megatransfusion case (142 units of packed cells).

Yes, the patient died (no surprise), but he survived for over 48 hr in the ICU with increasingly aggressive inotropic support (dopamine + epinephrine + levophed), continuing replacement of blood loss, and even high-frequency jet ventilation on and off. He gained about 50 kg (preop < 100 kg; 150 kg at death) from third space losses.

We did not use a rapid infusor as (eg, Level One), but avoided hand pumping by using an air regulator system set at a pressure of 400 mmHg hooked up to four or more "wrap around" pressure bags with velcro tabs. All blood was filtered to avoid clogging the filters in the blood sets; filters were changed after three or so bags (otherwise the filter resistance would be too high).

Despite four blood warmers, a heated humidifier, two forced air heaters and a very warm OR, nasopharyngeal temperature was only 32.2°C at the time of unclamping. (We have seen Ventricular Fibrillation on unclamping with colder temperatures)

We used the QT interval to "monitor" calcium levels. Despite giving calcium periodically, at one point the ionized calcium was 10% of the lower limit of normal! (At that point we drew up 6 g of CaCl₂ in a 60 ml syringe and gave it over about 30 min.)

This case gave us (and the surgeons) much to think about in terms of patient selection. Some of my colleagues are particularly distressed to find that some (many) of the patients are (reformed) alcoholics.

Reply 6

I have transfused two patients with > 100 units of blood - for multiple trauma. One lived and returned to productive life. One died. There is no doubt in my mind, however, that we are in a position (world-wide) where governments are rationing health care delivery by fixing the amount of money available to be spent. This may only affect private hospitals indirectly, but it still affects them.

The issues seem to me to be:

1. Those related to liver transplantation
2. Those related to massive blood losses

I have no experience of the former. I have plenty of experience with the latter.

Reply #4 raises some good points - but they are addressed at the rationing of health care resources. These are issues that need to be taken to the wider community in each country.

After all, 'The people get the health care delivery system they deserve.'

Reply 7

In Pittsburgh, we have done dozens of liver transplants with blood transfusion requirements >100 U packed cells, with several patients receiving >300 U packed cells. They usually receive similar quantities of FFP, a fair amount of platelets, and lots of crystalloid and colloid. We try to maintain normovolemia throughout this transfusion process, and monitor hematocrit, electrolytes, and blood gases at least every 30 min during such events. CaCl₂ is continuously administered to maintain normocalcemia, and THAM and HCO₃⁻ are given to treat acidosis. A rapid infusion device is used to transfuse the blood products; it is filled by technicians allowing the primary care provider to manage the patient. The rapid infusion device we use (Haemonetics) allows transfusion rates up to 1500 ml·min⁻¹, and is good for about 40-60 L transfusion; then problems such as clogging of the filter require it to be changed. Using all these techniques, we are usually able to maintain normal circulation in these patients! Cardiac output should be normal (which means 8-15 L·min⁻¹ in these hyperdynamic patients!).

Regarding the outcome: if we can avoid prolonged periods of severe hypovolemia or hypocalcemia, if the transplanted liver is functional, and if the patient has no other major medical problems, frequently such massive transfusions can be tolerated fairly well: many of these patients survive and leave the hospital! We also don't see a lot of transfusion-related ARDS in these patients.

Whether we should do such cases, or whether we should do liver transplantation at all, is a different topic. Some type of rationing in health care seems to be in order, but will be difficult. If we keep getting better in keeping sick people alive, the cost may continue to rise...

We do transplant alcoholics in Pittsburgh, but if at all possible, only after they have been sober for at least six months. Results are no worse than in non-alcoholics, and few seem to relapse. Few people here have moral objections regarding transplanting recovered alcoholics. By

the way, how many physicians object to treating patients with other “self-inflicted” diseases, such as those related to smoking, obesity, dangerous sports, etc.

Erratum

Vézina D, Trépanier CA, Lessard MR, Bussières J. Esophageal and tracheal distortion by the Esophageal-Tracheal Combitube: a cadaver study. *Can J Anesth* 1999; 46: 393–7.

Please note that Figures 1 & 2 were inverted.