

Daryl Teague Module 2 presentation

Sophie Scott (Master of Ceremonies): Module 2 is about the use of blood in a peri-operative setting. It contains a range of recommendations including healthcare settings establishing their own perioperative patient blood management program. And to discuss this further I'd like to introduce Daryl Teague. He's an orthopaedic surgeon and a co-head of orthopaedic surgery at the Royal Adelaide Hospital. Please welcome Mr Teague. [Applause]

Mr Daryl Teague: Thank you Sophie. And thank you very much for this opportunity to present this guideline. I'd like to echo Larry's remarks and mention one other person —Larry McNicol. I couldn't believe how Larry could keep us all focussed and give us things to think about. And he was, you know, the guy who was walking out and playing centre court Wimbledon but organising everything else that was happening in the golf competition. And you're great.

I wouldn't talk about the wise monkeys. I'd talk about blood brothers. [Laughter] And I felt like a blood brother and I had a lot of blood sisters as well, like Amanda and lots of others. But thank you for this opportunity.

This guideline has been developed with clinical input and expertise with a number of scientific and clinical colleges and societies throughout Australia and New Zealand. And it was a privilege to be part of it. My view is that of a fellow of the AOA and perhaps I gave a little bit of a surgical perspective with a balance of science, simplicity and straightforward application. They used to get me to read it and if I understood it, they thought it would be good for the guys in Kazakhstan as well.

In our everyday surgical practice we are faced with real, mortal humans. They have a problem, cry for help, superimposed on their own established co-morbidities and the solution may require risky intervention. And being informed that this entails perhaps the removal of a worn-out joint and replacing it with a prosthetic joint. Most patients will be concerned about the possible complications. Death. Infection. Fractures. Healing. Bleeding. And that's why we need a perioperative Patient Blood Management program.

As part of the pre-operative assessment we need to review the patient's current state of health, identify anaemia, coagulation status, from their liver and kidney function, look at their medication that might affect it like any anti-inflammatories and clopidogrel, aspirin, warfarin, fish oil and note their bleeding history and their healing ability.

Our surgical anatomical approach should respect vascular intervals, utilise perhaps an infiltration of adrenaline, where possible in the surgical field. And control bleeding on passage and salvage blood along the way. We respect the red cells. We build them. We keep them. We don't waste them.

Pre-operative assessment can identify and treat patients with low haemoglobin levels, low iron stores, coagulation inadequacies, and co-morbidities that increase risk of blood loss. See a guy with gynecomastia, he will bleed. Surgical and anaesthetic planning can minimise operative blood loss, and where it is anticipated, blood salvage measures can be initiated perioperatively and post-operatively. The patient can be advised that a low haemoglobin does not necessarily require a blood

transfusion. Particularly if iron stores are maximised pre-operatively, to boost the haemoglobin at the time of operation.

There are three pillars. Pillars of wisdom I call them in perioperative patient blood management. Using the waiting list time, which is so often regarded as an embarrassment, we can put a positive spin on it and we can maximise the patients' pre-operative fitness. And being surgically prepared to minimise bleeding, salvage blood loss and post-op blood drainage and to transfuse only, where clinically indicated.

So what can we do to improve patient outcomes? There are possibilities for real benefits to patient outcomes. Avoidance of the necessity for transfusion by maximising pre-operative HB is beneficial to the patient by decreased morbidity, decreased infection risk, decreased mortality, decreased ICU length of stay, and decreased length of hospital stay. So the timing of elective surgery should optimise the patient's ability to build up their pre-operative iron stores and their haemoglobin. Obviously, if a surgeon expects a surgical blood loss of 30 to 40 grams per litre, then building up a high haemoglobin level pre-operatively will diminish the demand for post-operative transfusion.

The flowchart template appendix that you have in your folders there, is on page 16 in the little clinical lab guide, the quick reference one, helps us with the stage rationale to identify any patients at risk. And to implement a treatment program to correct the situation prior to elective surgical and anaesthetic challenge. It may in fact, identify other clinical problems that urgently need rectifying prior to proceeding with elective surgery. We might end up making an honorary diagnosis of cancer of the colon. We note throughout the template, its frequent directions to seek advice from a haematologist, a gastroenterologist and other clinicians. This is a team game.

So, well before surgery we can initiate iron therapy which needs vitamin C to initiate the Fe⁺⁺⁺ and Fe⁺⁺ for better absorption. And remember that milk blocks iron absorption. Lots of patients have no idea about this and we do have to educate the doctors to educate the patients. IV iron may be indicated in some cases. And we've got some brilliant people here in Australia, and here with us today, who can help us with that. Ferritin is protein bound iron, so when we're looking at it, and we see low level, it infers iron deficiency.

So what can we do during the procedure that's going to help. Sometimes the operating theatre can look like this, just after the initial heated discussion between the surgeon and the anaesthetists. [Laughter] More commonly, it spells a story of major blood loss and all the attendant risks to the patient. What can we do to minimise perioperative blood loss?

Surgically anticipated blood loss should trigger immediate mechanisms to minimise blood wastage and maximise blood salvage at the time of surgery. Preventing hypothermia will reduce operative blood loss and the incidence and volumes of blood transfusion. Deliberate anaesthetic induced hypotension, the levels of mean arterial pressure of 50 to 60 millimetres of mercury can reduce blood loss and the incidence and volume of blood transfusion. In this respect, spinal anaesthesia becomes a positive help.

In my past, primitively in war surgery, in the past, I've collected bulk blood from a clean body cavity and immediately reinfused it through filters back into the patient. Today, thankfully we have more sophisticated options. The Sangvia device, that some of us will be familiar with, is a selective, suction

of blood, out of the operative field site. Directly returned to a storage bag, where it's filtered on route, before being reinfused immediately in the patient. In more elective circumstances with larger volume anticipated blood loss, an automated cell saver with dedicated stand by start-up, can reinfuse washed, filtered and concentrated and resuspended salvaged blood to return to the patient.

Good appreciation of surgical anatomy protects damage to major blood vessels. Minimally invasive approaches can reduce blood loss and morbidity to a fraction of that seen in open surgery. Removing blood from the operative field by returning it to the body, core blood volume with an Esmarch bandage prior to the application of a tourniquet in limb surgery prevents blood loss. At the end of a procedure, operative site infiltration with something like Naropin, ropivacaine mediates vasoconstriction locally in the wound. At wrap up, pressure limb bandages over the wound, and elimination of drains can conserve blood altogether.

It is useful to have cutting diathermy, coagulated diathermy, and the delight of argon beam diathermy. All of these techniques maintain a better surgical field mission, and minimise blood loss.

We've had a talk of tranexamic acid, and we do have a recommendation for this in hip and knee arthroplasty and cardiac surgery. I use tranexamic acid in open hip surgery with good perioperative and post-operative affect. Dispensing with the use of post-operative drains, to release free blood from closed and wound tissue spaces.

So what about after surgery? If you use surgical drains, then this collected sterile filtered blood, can be reinfused within four hours using a system like the Velovac or ConstaVac blood drainage collection systems. But be careful if you've already infiltrated the wound perhaps with local anaesthetics and other agents.

Post-operative transfusions, well, the revised haemoglobin trigger levels have reduced the practice of top up blood transfusions. It's no longer seen as a tonic for the patient to have a couple of units of blood on their way out of the hospital. In a healthy patient HBs of 70 to 100 grams may well be tolerated as witnessed in some of our Jehovah's Witness patients in the past. In post-op patients with myocardial or cerebral ischemia with haemoglobins between 70 and 100 grams per litre, a single unit transfusion with post- transfusion reassessment is appropriate. Remember that high haemoglobin numbers, do not always equate with immediate improvement in oxygen delivery to the tissues. Supplementary oxygen by mask, may be sufficient.

So it is our responsibility to establish these principles. These three pillars of wisdom. With respect to patient blood management, for the peri-operative period and we will be doing our patient a favour.

Remember the bottle of red you enjoy at the end of a busy operating day, may be more beneficial than the bags of red cells given to a blood deprived patient. Don't waste any red cells. Replacing them is not always free of trouble.

Thank you.