

Point of Care Coagulation Testing Case Study The Prince Charles Hospital Brisbane

Our approach to blood and blood products at Prince Charles is treating it as a liquid organ transplant which doesn't quite currently enjoy the same reverence, as for example lung and heart transplant and liver and bone marrow transplantation.

'ROTEM allows you to detect main patho mechanisms of bleeding in a timely manner and this is important because in severe massive bleeding, time counts and time is life. So we want to identify the cause of bleeding, why is my patient bleeding right now and within a few minutes ROTEM can give you an answer, whether hyper-thermolysis is there, whether fibrinogen deficit is there and probably also whether thrombin generation is a problem.

Look the introduction of the program here at Prince Charles has been a great learning experience for us. We had a traditional model of coagulation management which was really guesswork and we've now taken it through to really having some powerful data in real time for us to work within the operating theatre and as you can see from our results it's made a huge difference to both the practice of coagulation management and the whole issue of bleeding has become much more scientifically treated at our hospital.

So with Point of Care Coagulation testing, this is one of our instruments. We can get a blood sample from the patient and have it up and running in our instrument within minutes. That results then streams live back into the theatres and you can very quickly determine from the temogram if the patient has a normal ability to make a clot or to achieve haemostasis and if they do then it's most likely a surgical bleed, so the surgeon will just keep looking and try and find that nasty little hole that's stuck around the back of the heart somewhere. Or if they have a coagulopathy, they can identify what are the specific contributors to the dysfunction of haemostasis and treat coagulopathy appropriately with the targeted treatment.

The ROTEM information has allowed us to be specific to perioperative care, instead of medical bleeding which a lot of the previous tests were very helpful for. I think it allows us to be targeted and then we can specifically state to surgeons with visual clues and cues as to what the problem is and how best to determine the answer to it. And I think that it allows us to determine the specific components of the blood cascade that we need to affect as anaesthetists, whether it be fibrinogen factors, or even the need for specific drugs to counteract heparin. And I think that that specificity, the rapidity of its usage and the tailored use to the perioperative situation really helped us a lot. And it's a very dynamic situation, so we can do a test at time zero when we think we have a problem, do an intervention, do another test immediately and within 10 minutes we know if we're going in the right direction.

The point of care testing was obviously a very important package and does serve as a stake in the ground of the novel technology that was very important for people to base their testing around to give them confidence and their ability to reduce transfusion rates.

So we got everyone together to do a process map, figure out how we're going to do it, who are going to be the operators the interpreters, how we're going to apply governance. Governance is obviously really important.

You need good support from senior clinicians, from the executive, but most importantly, have the right workforce at the coalface to enforce appropriate protocols.

Well I think because we've had a huge team approach to the whole problem, both pre-operatively, intraoperatively and then in the intensive care unit, everyone has stepped up their game. So we are

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operating on less patients that are anaemic, we're being a bit smarter about correcting coagulation, particularly the antiplatelet agents pre-operatively and then in the operation we've got real-time data to work with. We can, if we've got a bleeding problem, we don't have to guess what the problem is, we can treat it appropriately. And that's been reflected in some of the practices, so we've seen an increase in the amount of cryo used and I think that just reflects the importance of fibrinogen in the whole process. But much less FFP and all the volume issues related to that at our particular unit, as well as retail use. So I think that's all been very positive both for us in the operating theatre but also for the patient.

We got people on side, we've got the pathologists on side, we've got the clinicians, the intensivists, the cardiac surgeons, the anaesthetist, the nursing staff, the perfusionists, everyone really buying into it. I think the key part was education, education, education. I think getting people on side and making it seen as a team event rather than a single person or a research idea was brilliant, and I think what we've seen now is people that were never interested in blood before are really really interested, and people that would dismiss it as a nothing before are totally bought in.

One of our clinical nurse consultants was instrumental in bringing a package of quality that we could all follow for the use in theatre. So for instance, accreditation and management around the equipment and also disseminating an educational package for people regarding interpretation. So we've had posters up around a number of areas around the hospital with how to interpret ROTEMs and a number of education sessions been introduced. And overall, I think this has been very very successful and a very very important part of implementing this new technology.

Blood products and making their use more appropriate across the entire campus or service, is a team effort and as stated, it starts with good patient education, early detection of anaemia and appropriate intervention, even prior to elective surgery, also making the, or standardizing for example, the massive blood transfusion protocols and making people aware of that, is very much at the forefront of creating these savings.

So with our results over the last 12 months since we initiated point of care testing, we've had an overall massive decrease in the amount of blood transfusion and both red blood cell units and non-red blood cell units. The major changes have been red blood cells, platelets and fresh frozen plasma, have all decreased significantly, with red blood cell use being cut by one third, platelet usage being cut by almost two thirds and fresh frozen plasma have been cut by almost three-quarters the number of units we've used. One of the interesting things we've found is that we've increased our cryoprecipitate use slightly although essentially the same number of patients have received units. We feel this probably reflects that instead of using transfusion of all blood components at the same time because we didn't have a directed approach, we're now using more appropriate targeted blood transfusion and so for instance, in the past we may have just used fresh frozen plasma we're now targeting the fibrinogen levels and using cryoprecipitate.

We have over a financial year managed to produce monetary savings of around 929 000 thousand dollars. Overall, our blood product usage has reduced by approximately 40 percent and the main contributing factors to that have been as stated, point-of care testing. The reason for that is if you have point-of-care available immediately by competent practitioners to anaesthetist, surgeons, intensivists etc., you can make a difference. And the cost the cost benefit of point of care testing is obviously self-evident in the savings that we have created.

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In big, big drops in our utilisation of blood and theatre and intensive care and in various other studies we've done we've shown that the less fluid they get, the quicker they get out of intensive care, the better they do and the cheaper their hospital stay is. So, it's beneficial the whole way around.

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