2026 Coagulation - Communication/Protamine

Permission to print:	Yes
Category	Coagulation
Category 2	Communication
Severity	Good Catch Near Miss
Duration of incident:	minutes
Procedure acuity:	Elective
Description:	At my centre, standard practice is to continue cardiotomy suction until 50% of the protamine dose has been administered. This requires the perfusionist to confirm administration progress with anaesthesia. As a training centre with frequent staff rotation, communication of this requirement is inconsistent, including among consultant anaesthetists. I was trained to discontinue suction at the commencement of protamine administration and raised concerns about the local protocol when I first joined, as I remain uncomfortable with the associated risk. The recent case involved unexpected circulatory arrest, massive bleeding, approximately nine hours of CPB, plasma administration on bypass, cooling to 24°C, hemofiltration and persistently abnormal ACT measurements despite repeated testing using different cartridges and analysers. These factors created significant uncertainty regarding coagulation status, although the circuit remained functional and was monitored closely throughout. The patient was transitioned from CPB to ECLS, but ECLS support was initially unstable due to inadequate filling, necessitating rapid transfusion. Cardiotomy suction remained active, while the cell saver was operating continuously. As per my usual practice, I maintained CPB circuit recirculation following separation from bypass. Most of the circuit blood had been returned to the patient to support filling, and I had begun transferring the remaining volume to the cell saver. When I asked anaesthesia whether 50% of the protamine had been administered, I was informed that the full dose had already been given. Cardiotomy suction was immediately discontinued, but the CPB circuit had completely clotted before the remaining blood could be transferred to the cell saver.
GOOD CATCH - what went well	Fortunately, the patient was already on alternative support, as the existing CPB circuit could not have been safely reused. My pump is routinely recirculated post bypass which may have temporarily prolonged circuit viability; however, given the extended bypass duration and pre-existing concerns regarding oxygenator function due to length of pump run, I would have opted for a new circuit if CPB re-initiation appeared likely. Primed circuits were readily available overnight and therefore would not have taken long. In relation to the peri-operative coagulation issues we tried to mitigate risk by using different ACT analysers, running further laboratory tests and despite continued out of range ACTS giving incremental doses of heparin throughout the bypass run based on half life/timing in the procedure/temperature etc. Once full protamine administration was recognised, suction was immediately stopped and this was communicated to the team, with closed-loop confirmation from the surgeon that it was agreed and voiced that the circuit was no longer considered viable. Blood loss from circuit clotting was minimal, as most blood had already been returned to the patient or transferred to the cell saver in anticipation of the ongoing blood loss and volume requirements. The residual volume lost to the clotting was therefore unlikely to have significantly

	affected the patient's haemoglobin.
What could we do better	The team could have followed our 50% communication protocol, particularly given the ongoing uncertainty and inconsistencies surrounding coagulation. These concerns could have been discussed prior to weaning/bridging, with consideration given to discontinuing cardiotomy suction earlier during protamine administration, despite our current protocol, in light of the unexpected coagulation-related factors. A second cell saver could have been offered as an alternative. We could consider revising our protocol to discontinue cardiotomy suction at the commencement of protamine administration, in line with current evidence, to help preserve circuit viability should CPB reinitiation be required.
Preventive actions	This was documented in the sign-out. I have not yet returned to work since the case and therefore have not had the opportunity to discuss it further with the team. I believe a thorough, multidisciplinary debrief would be valuable to review the case and collectively examine the multiple contributing factors. These include the fact that everyone was fatigued, the case occurred in the middle of the night, and competing clinical priorities may have resulted in some fundamental practices being overlooked. However, it is precisely under these challenging circumstances that such incidents are more likely to occur, highlighting the importance of maintaining consistent safety practices. One potential action arising from this review would be to establish a clearer protocol for discontinuing cardiotomy suction earlier, particularly before protamine administration. Evidence suggests that the reversal of heparin with protamine allows coagulation to resume, immediately increasing the risk of clot formation and compromising circuit integrity if blood continues to be returned to the circuit. I would recommend that this be considered as part of the wider team discussion, with the aim of identifying practical improvements to minimise the risk of similar events occurring in the future.
Type of incident:	Human Factors
Timing of incident:	PostCPB
Discussed with team:	Yes
Hospital incident filed:	No
Ext Authority Advised	No
Supplies Issue	No
Knowledge issue	No
Protocol issue	Yes
Rule issue	Yes
Skill issue	Yes
Team Issue	Yes
Violation	Yes
Patient outcome variance	Nil
Commentary	Coincidentally this near miss report directly follows another report of a clotted circuit due to continued use of cardiotomy suction after protamine. Here there is an overlay of a highly complex, extremely long procedure where fatigue and stress contribute to a breakdown in communication on protamine administration. Clear international guidelines and perfusion standards to discontinue cardiotomy suction at the onset of protamine administration have been previously cited. PIRS2 Editors Disclaimer: The commentary accompanying PIRS2 reports reflects the editorial

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