2019 circuit disruption

Permission to print:	Yes
Incident type	Good Catch Near Miss
Type of incident:	Equipment
Procedure acuity:	Emergent
Description:	Full and detailed description of incident or variance

Pump boot rupture during bypass. The incident occurred during bypass for a routine AVR with all the relevant circuit checks completed prior to commencement of bypass including assessing the occlusions which were set to the standard setting for pump boot occlusion. It was on a Sunday afternoon with only myself [perfusionist] in theatre The circuit was a pre connected Medtronic Fusion oxygenator with a taped 3/8 - 1/ 2 inch fully pre connected PVC pump boot with only two connection points being on the outlet of the reservoir and the inlet of the oxygenator. It occurred at the end of the operation.
The aortic cross clamp had not yet been removed and the patient was 37 degrees Celsius. The rupture occurred in the race way [and] was initially noticed by seeing some condensation forming on the inside of the lid of the arterial pump head. The rupture was initially minor but rapidly progressed to a critical state. A single drop of blood then appeared followed by a small spray of blood on the inside of the arterial pump lid. Fortuitously we were warm and nearing taking the aortic cross clamp off. The small spray progressively got worse until blood was actively pouring out the front of the pump through the tubing collars and down the face of the pump. This appeared to increase dramatically from a spray to a trickle to a steady flow very quickly after filling and de airing the heart.
The anaesthetist and surgeon were immediately notified of the situation and additional staff including the anaesthetic technicians on duty and available nursing staff were called upon to provide assistance in getting the appropriate equipment needed to change out the pump boot. The replacement boot and associated connectors had to be cut out and fashioned from another circuit which had to be recovered from the perfusion set up room witch was around 20 meters away and not in ear shot of the operating theatre involved. It was obtained by staff unaccustomed to the required equipment. A new boot was fashioned and primed ready for the change out should the situation have deteriorated to an unmanageable level. The patient was weaned off bypass as quickly as possible and no deleterious sequalae has been noted in the patient post operatively. The pump was not stopped at any point till fully off bypass.
The SVo2 and all other parameters were within normal range for bypass and did not change through out the incident. Approximately 1.5 litres of plasmalyte was needed to transfuse the patient up to complete the wean from bypass and the first gas off pump had a Hb of 10.4.
Once off bypass the pump boot was rapidly changed in case bypass was further required. This was not the case.
We don't measure pre oxygenator pressures. There was no evidence of increased resistance noted. The line pressure was consistently in the 140 - 150 mm Hg range and did not change. There was no noticeable pump boot distention although this would have been difficult to identify with a fully PVC boot.

GOOD CATCH - what went well	Good communication and team work with obtaining and preparing the new boot. A no panic approach and swift actions to come of bypass effectively and safely was adopted by all staff involved.
What could we do better	More immediate access to a replacement pump boot and the presence
Preventive actions	Replacement pump boots are now being obtained to replace the existing ones in use

	pending further investigation into the current tubing. Sterile pump boots inclusive of boded 3/8 connectors are being ordered to be added to all perfusion trolleys as a mandatory requirement.
Catagory	Circuit disruption
Region	ANZ
Manufacturer advised:	Yes
Hospital incident filed:	Yes
Ext Authority Advised	Yes
Patient outcome variance	Nil
Discussed with team:	Yes
Commentary	This Good Catch exemplifies the importance of clear timely and succinct communication in an emergency in the cardiac OR. This amongst the most challenging incidents reported and calm heads prevailed. It also brings attention to the question of staffing (N+1) especially outside normal working hours.