2022 servoregulation

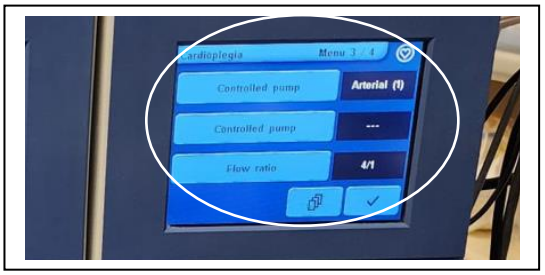
Permission to print:	Yes
Category	Pump Servoregulation
Incident type	Good Catch No Harm Incident
Duration of incident:	minutes
Description:	

I was scheduled to undertake an urgently planned pulmonary thromboembolectomy on a patient who was already on V-V ECMO with thrombus evident in both pulmonary arteries and low saturation despite being on V-V ECMO. The patient was over 140 kg, and I decided to set up a new Inspire circuit as we have two 6F inspire circuits already set up for emergency procedures. Since my patient was over 100 kg, I set up Inspire 8F on an S5 pump that had just arrived from Biomedical engineers after the annual service. This S5 machine had all functional spectrum probes. I decided to use it for the hypothermic circulatory arrest part of my case. I set up my circuit and primed it without any problems; the Checklist was completed, including the check of overall safety settings, and they appeared correct, apart from four icons active on the main arterial display. I was a little curious about it; usually, we only have three safety icons activated (level, bubble and pressure), but this time there were four safety features highlighted instead.

The background to this was, about a week or two, we were advised that all our machines are getting new software updated and this software will have a few extra features. Having this background knowledge, I assumed this additional safety feature was due to the recent software upgrade. To further strengthen my assumption, I asked one of my colleagues what this other safety Icon meant in the main arterial display. Again, she confirmed that it was very likely a new software update. I usually keep the main arterial pump running, with the cardioplegia pump in recirculation mode, until we hand off the lines. Once heparin was given, I turned my pump off and did my occlusion tests with a scrub nurse dividing the lines. Everything was going as planned. Once the patient was cannulated and connected to the bypass machine after achieving the required ACT, the bypass was commenced. Everything was going as planned; I started the cardioplegia pump and dearied the cardioplegia line towards the table while the cardioplegia display was in recirculation mode. Once the surgeon cross-clamped the aorta, I turned the pump down, pressed the x-clamp timer, and simultaneously delivered cardioplegia. All was going well, the heart was arrested, and the intracardiac temperature decreased rapidly to the desired temperature. Although the amount of cardioplegia delivered on display looked a bit odd, showing a delivered 21.76 litres of cardioplegia, I thought I may not have pressed delivery on time and ended up calculating it manually, turned the cardioplegia delivery off at the end of the total dose. Once I turned my cardioplegia delivery off, it turned my main arterial pump off. I could not understand what had happened for a second, so I immediately bypassed the pump's safety features [double hand icon on S5] and kept it running. The perfusion coordinator and a second colleague immediately came to the OR to assist. While the pump was running, I investigated if any error was displayed. No error message was displayed on the panel; however, the only indication was the orange icon on the main arterial pump (fourth feature).

I ensured the bypass was running smoothly and called for help. The biomedical engineer was called, and she could not find anything wrong with the pump or the settings as all settings were as expected, according to her. She did some troubleshooting while I was on bypass. Still, every time I deactivate the bypass safety feature, the pump will stop, with an activated orange light icon on the main arterial display. We could not understand what was happening as all the

settings, including stop link settings, were correct. I decided to continue bypass with safety features turned off while help staff were trying to figure out what was going on. The biomedical engineer checked the settings of the other S5 pumps in the perfusion room and found out where the problem was (see below). Once the settings for the cardioplegia pump were replicated to the other HLM settings, the extra icon on the main display disappeared. I reactivated the safety features and the pump did not stop. This solved the problem, and the rest of the case continued without any pump issues. During the annual maintenance of the S5 pump, the settings on the cardioplegia pump were changed or defaulted, creating a link between arterial and cardioplegia pumps. This resulted in the cardioplegia pump controlling the main arterial pump. When the cardioplegia pump was on, the main arterial pump would work, but when you turned it off, it would also turn off the main arterial pump and activate the safety icon on the main display. Once we changed the name of the cardioplegia pump to cardioplegia 2a, the icon disappeared from the main display, and everything went normal.



GOOD CATCH - what went well	Immediate available help, staying calm and using the bypass safety function.
What could we do better	A detailed post maintenance functional checklist as a change in practice. As we do not have anything currently in place.
Preventive actions	institute a detailed post maintenance funactional checklist on receipt of the HLM prior to the HLM approved for use. Also the standard HLM checklist to include additional check on servoregulation sub settings.
Type of incident:	Management
Hospital incident filed:	No
Ext Authority Advised	No
Discussed with team:	Yes
Rule issue	Yes
Skill issue	No
Team Issue	No
Commentary	This good catch (no harm incident) was managed by immediate judicious use of the servoregulation override avoiding any compromise to myocardial protection. The immediately available N+1 perfusion staff and biomedical engineers demonstrate system resilience. Confirmation bias (the assumption the appearance of the additional icon was associated with an IT upgrade) is a potential ever present risk PIRS Ed.