DISCONNECTION OF SMARxT® TUBING FROM THE VENOUS OUTLET OF THE TERUMO CAPIOX® SX25RX OXYGENATOR DURING CARDIOPULMONARY BYPASS

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The use of surface modified, biocompatible, tubing in cardiopulmonary bypass, has been shown, to decrease the inflammatory responses caused by blood contact with the non endothelial surface of PVC tubing. Newling and Morris (2005), reported a decrease of grip strength when using surface modified SMARxT® tubing compared to standard PVC tubing in vitro. We previously reported an incident involving disconnection between two different biocompatible surfaces to PIRS in 2005. We now report two additional incidents.

The cardiopulmonary bypass circuit we had routinely used for over 6200 cases consisted of a Terumo Capiox® SX25 oxygenator with Cobe PVC tubing. In August 2004, we changed to Cobe SMARxT® tubing and in April 2005 we incorporated the Terumo Capiox® SX25RX oxygenator. Prior to the introduction of the coated oxygenator, no connection problems had been evident. One disconnection was reported in June 2005. At this time we revised all of our set up protocols and the recommended actions from manufacturers and had no problem for nearly 12 months. All outlets of the SX25RX oxygenator, which were connected to SMARxT® tubing were pushed fully onto the barbed connectors and tensioned cable ties applied to all outlets.

On two consecutive days, the pump boot disconnected from the venous reservoir outlet of the oxygenator during bypass, causing patient blood loss and a potential disaster. On both occasions, bypass was ceased prior to any air reaching the oxygenator arterial outlet. The tubing was reconnected, de-aired and bypass recommenced. Both cases were completed without further incident. No adverse clinical sequelae were noted in either patient.

To maximally attempt to determine the cause of the incidents, we undertook investigations designed to examine whether the design of the venous outlet port on the oxygenator, the slipperiness of the tubing, or a combination of both were important. In addition to our own tests we asked the manufacturer/distributor of both the oxygenator and the tubing, to carry out testing on both components.

Our preliminary investigation revealed firstly that SMARxT® 3/8" x 3/16" tubing when fitted on the 3/8" venous reservoir outlet and cable tied, appeared to be secure, but when left for a period of time the integrity of this connection became compromised. We found that this did not occur when SMARxT® 3/8" x 3/16" was connected to other 3/8" connectors of the SX25RX oxygenator, or when PVC tubing was connected to the venous outlet. Following the manufacturer's recommendations for connecting tubing to the outlet did not result in a secure connection.

We conclude that SMARxT® 3/8" x 3/16" tubing should not be used on the venous outlet connector of Terumo Capiox® SX25RX. It appears as though the design of the outlet may contribute to the disconnection.

Newling R, Morris R . SMART Tubing Presents an Increased Risk of Disconnection During Extracorporeal Circulation. JECT 2005;37:400-401