The classic article topic for this issue of *JECT* is particulate microembolization during cardiopulmonary bypass (CPB) and comes from Dr. Solis and his 1974–1976 Baylor College of Medicine team. Solis et al. (1) assessed the filtration characteristics of blood filters inserted in the cardiotomy reservoir drain line in vitro and during CPB. They measured 13- to 80-μm particles before and after the integral cardiotomy filters, and filters cut into the cardiotomy drain line in vitro using a pooled blood bank challenge. Solis et al. also measured particulate counts in the cardiotomy drain in-line filters during 10 CPB patient procedures. It is of historical interest that the best filter in their study was the Dacron wool depth filter. It became known at the time that the Dacron filter removed a significant number of platelets also. Solis et al. challenged manufacturers at the time to produce more efficient cardiotomy reservoir filtration systems.

In 1974, Solis also wrote a *JECT* companion article relevant to our topic (2). Solis systematically reviewed 65 publications dealing with microaggregates during CPB. Referencing four articles from the 1961–1969 thoracic surgery literature, he listed the infusion of fat, fibrin, and other foreign material through the coronary suction system as one of five major factors implicated in microemboli during CPB. Of course, the advent of membrane oxygenators reduced the particulate microembolization; however, considerable particulate material is found in the blood returning through the cardiotomy return system, especially during complex intra-cardiac procedures and large incisions (3,4).

In this issue of *JECT*, Ajzan et al. (5) from the Hammersmith Hospital in London publish an article dealing with fat embolization with and without CPB. Ajzan et al. set out to see whether fat embolization is still the problem with CPB that Solis et al. aptly described in a 1974 scientific review and a 1976 study and whether there is a difference in the free fat emboli load between off-pump coronary artery bypass (OpCAB) and CPB patients. Ajzan et al. report the absence of fat aggregates in the blood of OpCAB patients. They found significant fat emboli in the CPB patients that came from the cardiotomy suction system. Ajzan et al. stated that CPB patients remain at risk for fat embolization just as reported by Solis et al. in the early 1970s and that the highest fat embolic load was found in the cardiotomy suction blood. Ajzan et al. reported the majority of the fat emboli to be in the 5- to 20-μm range and that the CPB circuit equipment was not completely effective at removing fat emboli before patient arterial infusion.

Solis (2) reviewed the role microaggregates played in the development of pulmonary insufficiency. He points out that CPB blood should be efficiently filtered before arterial infusion. Solis called for the clinical comparison of the efficiency of various filters and reported that human studies identifying the consequences of microaggregate infusion had not been performed as yet in 1974. Although it was not the direct purpose of the study of Ajzan et al., it reported no apparent gross signs of embolic or neurologic injury in either patient group in the study.

Today there are recommendations to avoid the reinfusion of cardiotomy blood (6), yet despite these recommendations, the subject remains in debate. “The more closed the bypass system, the better (7).” How many times have we heard this? We are taught this in our perfusion education programs—yet, in clinical practice, rarely do we see a completely closed CPB circuit? How about miniature extracorporeal (ECCs)? Authors are reporting only marginal changes as assessed by blood loss, need for blood products, and intensive care unit and clinical stays when using miniaturized CPB circuits (8). However, safety margins for volume loss, air emboli, and weaning from CPB decrease, because of the closed circuit. Results are mixed—modification of perfusion management with optimized air management needs to be further studied as an effective strategy in reducing the inflammatory response and influencing the coagulation system (9). It is time to perform a systematic review or meta-analysis on the recent body of work (10–16) comparing CPB outcomes with and without direct cardiotomy suction blood infusion.

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REFERENCES


