

1 **Abstract:**

2 Objective: In lung transplantation, unexpected pulmonary emboli, including thrombi and fat,
3 have been observed with high probability and are associated with potential primary graft
4 dysfunction. We evaluated a new perfusion method using warm retrograde flushing that
5 removes more fat than conventional cold retrograde flushing. Methods: We developed a novel
6 porcine donor model for pulmonary fat embolism by administering autologous fat in the left
7 pulmonary artery. The left pulmonary artery and the left superior and inferior pulmonary veins
8 were cannulated for flushing and collecting these solutions. After flushing, the left lung was
9 reperfused under observation for three hours. Two groups underwent warm and cold additional
10 retrograde flush (WS; warm solution group, CS; cold solution group). Results: The fat removal
11 rate in the antegrade flush was equal in both groups ($3.0\pm 0.6\%$ vs $3.0\pm 0.4\%$, $p = 0.46$); however,
12 the rate was significantly greater in the WS group in retrograde flush ($25.2\pm 3.2\%$ vs $8.0\pm 1.4\%$,
13 $p = 0.01$). Histology with Oil Red O staining and its software analysis showed more residual fat
14 in the CS group ($0.12\pm 0.01\%$ vs $0.38\pm 0.07\%$, $p = 0.01$). There was no significant difference in

- 15 the pulmonary function and hemodynamics during the 3-hour period after reperfusion.
- 16 Conclusion: Warm retrograde perfusion can remove more fat from lung grafts with fat embolism
- 17 in a porcine donor model.