

Is There a Role for Local Thrombolysis in High Risk Pulmonary Embolism after Cardiac Surgery?

Vassallo MC* and Tartamella F

Cardiac Intensive Care, Luigi Sacco Hospital, Italy

*Corresponding author: Vassallo MC, Cardiac Intensive Care, Luigi Sacco Hospital, Milan, Italy, Email: claudiovassallo@gmail.com

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Editorial

High risk pulmonary embolism is rare after cardiac surgery. However, it can be catastrophic as right ventricular dysfunction might not be well tolerated after cardiac surgery and can be associated with mortality as high as 50%. Moreover, systemic thrombolysis (ST) dramatically increases the risk of life threatening hemorrhage, especially when classical sternotomic surgery has been chosen in place of minimally invasive surgery. Open thromboembolism has been used in past decades with questionable results.

Recently local intra-arterial thrombolysis (LT) has made a comeback after evidence has shown its efficacy and safety. In a recent randomized controlled trial Macovei et al. [1] randomized 28 non cardiac patients with high risk pulmonary embolism to LT or ST and obtained significant advantages in the LT arm as lower mortality, lower right atrio-ventricular gradient and lower bleeding. Others have obtained similar results.

With modern 3D transesophageal echocardiography visualization of the thrombus and main pulmonary arteries has considerably improved. The tip of the pulmonary artery catheter (PAC) can be easily advanced and placed near the thrombus under 3D real time echocardiographic imaging. After placement of the PAC, a short half-life thrombolytic agent can be infused and thrombolysis

can be documented with 3D real time echocardiography. Thus, when fissures in the context of the thrombus ensue, the PAC can be furtherly advanced while the infusion of LT is continued. This method determines the rapid and regional disintegration of the thrombus without substantially impairing systemic coagulation. Lung reaction to LT might abruptly increase pulmonary hypertension and decrease right ventricular function. Thus, right ventricular stroke volume index must be aggressively sustained using inhaled nitric oxide, inodilators and systemic vasopressors. Pretreatment with levosimendan might be started before the procedure.

In summary, recent evidence suggests that local thrombolysis can be effective and safe, especially in high risk pulmonary embolism patients with high risk of consequent hemorrhage. Post-operative cardiac patients seem to meet those criteria. Obviously further research is essential before we start using routinely this intriguing and promising technique.

References

1. Macovei L, Presura RM, Arsenescu Georgescu C (2015) Systemic or local thrombolysis in high-risk pulmonary embolism. *Cardiol J* 22(4): 467-474.