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Percutaneous treatment of pulmonary thromboembolism: clinical presentation and hemodynamic results in usual clinical practice

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Introduction: Acute pulmonary thromboembolism (PE) presents significant mortality and complications, especially in cases of intermediate-high and high risk. Systemic thrombolysis (ST) is accepted for cases of high risk and cardiogenic shock but with an important incidence of severe hemorrhage. There is increasing interest in percutaneous alternatives for PE treatment. We present the results of our percutaneous treatment program in intermediate-high risk PE.

Methods: Prospective observational study that includes all patients with intermediate-high or high risk selected for percutaneous treatment since March 2017. The inclusion criteria were high-risk PE and contraindication of ST or intermediate-high risk PE with bilateral thrombus in computed tomography (CT). We describe the procedure, the clinical evolution during admission and the evolution of hemodynamic parameters before percutaneous therapy and 24 hours after treatment.

Results: We included 40 patients, most of whom of intermediate-high risk 37 (92.5%). The mean age was 61.03 ± 2.4 years, 50% males. All patients with echocardiographic involvement of the right ventricle and elevation of troponin. The time elapsed between the diagnosis by CT and the procedure was 18.5 ± 6 h. A right catheterization was performed to obtain hemodynamic pressure in right cavities and cardiac output by thermodilution (CO). In all cases, pulmonary angiography was performed. Percutaneous treatment includes at least one of these options: flexible pig-tail catheter in the area of the main thrombus and infusion of recombinant tissue plasminogen activator (r-TPA) at 1 mg/h for 24 hours, bolus of rTPA 5-10 mg by pulmonary artery, mechanical thrombectomy with fragmentation, thrombus aspiration or balloon inflation. Venous puncture of upper limbs was used for access (right basilica in 40%, right cephalic 25%) only one case with femoral vein access. Infusion of rTPa was performed in 95% of cases with an average dose of 22.38 ± 0.8 mg and a duration of 22.21 ± 0.6 h, fragmentation in 23.5% and thrombus aspiration in 10%. There were no immediate complications in the procedure. At 24 hours (22.6 ± 0.5 h) a hemodynamic improvement was observed: mean pulmonary artery pressure (PAMP) 36.26 mmHg versus 25.91 mmHg (p <0.0001) and CO 3.6 L/min versus 4.86 L/min (p <0.001). There was objective improvement in 85.2% and angiographic improvement in 65%. Only one patient evolved to shock and died. Only two major bleeds were observed (BARC 3A and BARC 3C) in relation with femoral access hematoma and intracranial bleeding. The average income in critical units was 2.88 ± 0.23 days.

Conclusions: Percutaneous treatment of intermediate-high risk PE based on local infusion of r-TPA was effective in reducing PAMP and increasing CO at 24 hours with a low incidence of bleeding and good evolution. These data would support the possible creation and implementation of a "PE code".