

Thrombolysis for acute massive pulmonary embolism in a patient aged 94 years

Summary

The elderly are at increased risk for pulmonary embolism because of both the conditions common to this age group, and the immobility that often accompanies them. Pulmonary embolism is often underdiagnosed and undertreated in the elderly. In massive pulmonary embolism, lysis of thrombi can be achieved faster with thrombolytic therapy than with conventional heparin therapy, but it is administered with more caution in elderly than in non elderly patients because of the risk of bleedings. However, thrombolytic therapy might be of value also in elderly patients, allowing potentially more rapid improvement than is achieved with heparin therapy. We report an elderly patient who fared well after thrombolysis for acute massive pulmonary embolism.

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Key-words

**pulmonary embolism
thrombolysis
elderly patients**

Background

Pulmonary embolism is a potentially life threatening disorder. The incidence of pulmonary embolism rises with age, as does its mortality. Pulmonary embolism is often underdiagnosed and undertreated in elderly compared with nonelderly patients owing to the non specificity and atypicality of presentation. In massive pulmonary embolism, lysis of thrombi can be achieved faster with thrombolytic therapy than with conventional heparin therapy, but it is administered with great caution in elderly patients because the risk of bleeding is thought to be higher than in nonelderly patients. We report a case of a 94 year old woman with acute massive pulmonary embolism and severe hemodynamic impairment. She underwent thrombolytic therapy and did well without serious complications, despite the old age.

Case Report

A 94 year old woman was transferred from the Geriatric to Cardiology Division because of sudden dyspnea, cough and worsening hemodynamic conditions. She had been admitted to the hospital ten days before with a fracture of the right arm owing to an accidental fall. In 1994 she had a femoral fracture due to another accidental fall, complicated with acu-



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te pulmonary embolism. On admission the patient was tachycardic (102 beats/min), severe dyspnoic and profuse sweating. Blood pressure was 100/60 mmHg and the oxygen blood saturation 82%. An electrocardiogram revealed a complete right bundle block that was not present previously (Figure 1). A hemogasanalysis showed a pH of 7.46 with a marked hypoxemia (22.5 mmHg) and hypocapnia (53.9 mmHg). An echocardiogram revealed a marked enlargement of right ventricle with septal flattening, moderate insufficiency of tricuspid valve with 70 mmHg pulmonary artery derived pressure, and normal ejection fraction of left ventricle. It was performed a spiral computed tomographic scan that showed a massive bilateral pulmonary embolism located both in pulmonary trunk and in various secondary diramations (Figure 2). The patient immediately underwent oxygen and unfractionated heparin administration (3000 UI bolus and infusion of 800 UI/h). Nevertheless, she fared worse in a few hours complaining of a pulse of 140 beats/min, a respiratory rate of 24 breaths/min with an air pulse-oximetry of 72% and a blood pressure of 80/60 mmHg. It was decided to administer thrombolytic therapy (1.5 mg/Kg, Recombinant tissue-type Plasminogen Activator [r-TPA], 10 mg bolus and infusion of 70 mg over 120'). Slowly the clinical conditions critically improved. The oxygen blood saturation increased from 72 to 90% and pulse rate was 88 beats/min. The unfractionated heparin infusion was continued over 72 hours. aPTT ratio was kept >2.5 and platelet count was of 14×10^9 L (normal

Figure 1. Electrocardiogram showing a complete right bundle block previously absent.

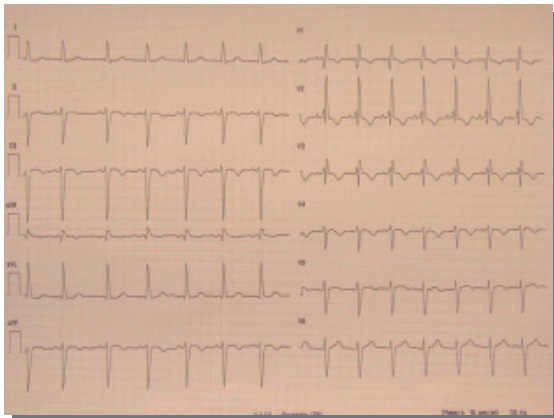
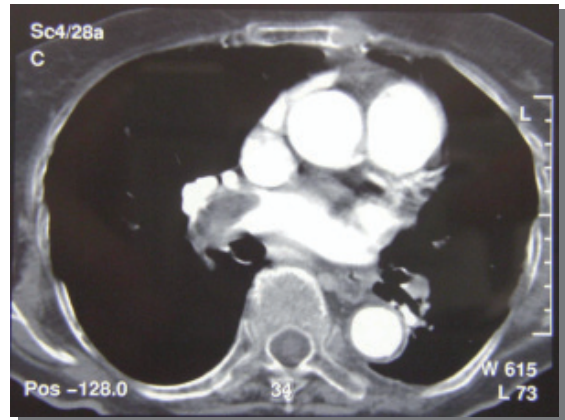


Figure 2. Spiral computed tomographic scan showing the main pulmonary trunk involvement by pulmonary embolism.



range 150-400); hemoglobin values 6 and 24 hours after thrombolysis were 11g/dL (normal range 12-16 g/dL) like on admission. No major or minor bleedings were remarked during the following hours. A repeat echocardiogram showed that right ventricle dimension was normal with disappearance of septal flattening and a pulmonary artery derived pressure of 40 mmHg. On the 4th day the patient was transferred again to the Geriatric Division. Our therapeutic indication was chronic anticoagulant therapy (warfarin with INR from 2 to 3) and perindopril 4 mg/day.

Discussion

Pulmonary embolism is life-threatening. Some patients may present with abrupt onset of critical illness, and others may suffer stuttering but progressive clinical deterioration. The therapeutic options of pulmonary embolism are based on the clinical grade and range from anticoagulation with heparin to thrombolysis, percutaneous embolectomy, catheter fragmentation, angioplasty or, more rarely, surgical embolectomy by open surgical removal of clot, especially if other treatments fail. In absence of contraindications initial treatment of pulmonary embolism should consist of parenteral anticoagulation with unfractionated heparin. Long-term anticoagulation therapy, usually with warfarin, should be administered according to the individual risk profile of the patient. Although systemic fibrinolysis is not worth the risk in all patients with pulmonary embolism¹, it is recommended as standard first-

line treatment in patients with massive pulmonary embolism and cardiogenic shock². Similarly, thrombolysis has been reported to be effective in nonmassive pulmonary embolism with right ventricular dysfunction on echocardiography³. In an overview of 5 randomized controlled trials that included patients with massive pulmonary embolism, fibrinolysis reduced the risk of death or recurrent pulmonary embolism by 55%¹. The major complication of thrombolysis is hemorrhage (6-20% of cases). The most feared bleeding complication is intracerebral hemorrhage which has a reported incidence of 0.6-3%⁴. The risk factors associated with intracranial bleeding are increasing age (0.4% at < 65 years and 2.1% at >75 years), increasing dose of thrombolytic, chronic hypertension, female sex, low body mass (with weight <70 Kg being associated with a four fold increase) and pulmonary catheterisation^{5,6}. In a database regarding 312 patients with pulmonary embolism who received thrombolysis in five clinical trials, Mikkola et al.⁵ found that patients with a major bleeding complication were on average older than patients with no haemorrhagic complication (mean age 62.9 ± 1.9 years vs 56.2 ± 1.1 years, $p = 0.005$). In an adjusted analysis, there was a fourfold increased risk of bleeding among patients older than 70 years compared with patients younger than 50 years (RR 3.9; 95% CI 1.7 to 8.9). When age was examined as a continuous variable, there was 4% increased risk of bleeding for each additional year of age (RR 1.04; 95% CI 1.02 to 1.06).

Another study regarding age and pulmonary embolism thrombolytic treatment, has suggested a higher frequency of bleeding complications among elderly compared with nonelderly patients⁷. Therefore, the results for age in this clinical setting are similar to findings after myocardial infarction thrombolysis⁸.

By contrast some studies have shown that thrombolysis administered for massive pulmonary embolism in patients free of contraindication yields similar results and carries a similar risk for bleeding complications in elderly compared with nonelderly patients^{9,10}. Yet, Thrombolytic therapy might be of value in elderly patients also, in allowing potentially more rapid improvement than is achieved with conventional heparin therapy.

Nowadays three drugs (streptokinase, urokinase and r-TPA) are used for the systemic tre-

atment of acute pulmonary embolism that share similar thrombolytic effect but have different administration modalities. r-TPA is generally preferred due to its more rapid effect and should be administered in a 2-hour regimen, in a dosage according to body weight (like myocardial infarction) to minimize the risk of bleeding¹¹. Despite more than three decades of experiences with thrombolytic agents and several randomized clinical trials, yet enrolling a relatively small number of patients, their role in the treatments of acute pulmonary embolism remains controversial. In comparison to heparin these drugs produce a more rapid rate of resolution of pulmonary embolic obstruction and may be beneficial, although an evidence for mortality benefit is lacking¹².

Our patient was 94 year old, and in spite of the possible risks of thrombolytic therapy regarding the age^{5,7}, we decided its administration because the worsening clinical conditions evolving to cardiogenic shock, right ventricular dysfunction on echocardiogram and involvement of pulmonary trunk on computed tomography scan, were considered to be life-threatening¹³. Fortunately, we did not have major or minor bleedings. Of note, we have not capabilities for pulmonary catheterisation or surgical embolectomy. However, the former has been shown to improve cardiac output and has a mortality of 11% in a series of non-shocked patients with moderate to severe right ventricular dysfunction¹⁴. On the other hand surgical embolectomy has been used in critically ill patient and when thrombolysis is contraindicated. Perioperative mortality rates are reported as 29-44% in this group¹⁵.

Finally, we think that management of massive pulmonary embolism remains a clinical challenge in older patients, but old age should not preclude thrombolytic therapy in massive pulmonary embolism provided there is no contraindication for thrombolytic treatment. By heightening awareness of the appropriate management in this age group, considerable mortality may be avoided.

Conclusion

At present, pulmonary embolism is underdiagnosed and undertreated in the elderly. Thrombolysis therapy should be considered for all hemodynamically unstable patients with pulmonary embolism, regardless of age. **TiM**

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