Perioperative Ultrasound Screening of Lower Extremity Veins Is Effective in the Prevention of Fatal Pulmonary Embolism in Orthopaedic Patients

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Purpose: We set out to assess the risk factors associated with pulmonary embolism (PE) and investigate whether perioperative ultrasound screening of lower extremity veins in orthopaedic patients can effectively reduce the incidence of fatal pulmonary embolism (FPE).

Methods: Overall, 137 patients with PE who had undergone orthopaedic surgery from 2013 to 2020 were enrolled. The patients were divided into a survival and a nonsurvival group based on whether FPE occurred during hospitalization. Their demographic and clinical data were compared.

Results: There were 137 cases diagnosed with PE included in this research among 341,418 orthopaedic inpatients from 2013 to 2020 in our hospital. 110 patients survived from FPE (survival group) and 27 patients were included in the nonsurvival group as they were diagnosed as FPE. Comparing the survival group and nonsurvival group by univariate analysis, 88.7% of PE cases profited from ultrasound screening, which is higher than the 53.3% who were not treated by ultrasound screening ($P<0.001$) in orthopaedic patients. In fracture patients, ultrasound screening also presented more benefit (with ultrasound vs without ultrasound 86.1% vs 50%, $P<0.001$). Furthermore, inferior vena cava filter (IVCF, with vs without 100% vs 0%, $P<0.001$), thrombolytic therapy (with vs without 96.7% vs 76.4%, $P<0.001$), and CTPA (CT pulmonary angiogram) examination (with vs without 100% vs 62.0%, $P<0.001$) were useful treatments to prevent FPE comparing survival group with nonsurvival group. According to multivariate regression analysis of risk factors for FPE, coronary heart disease ($P = 0.006$) and orthopaedic surgery ($P = 0.039$) were the significant risk factors.

Conclusion: Ultrasound screening of lower limb veins should be routinely performed in orthopaedic patients during the perioperative period. Prophylactic inferior vena cava filter implantation, thrombolytic therapy, and CTPA in patients with suspected PE can be performed to reduce the incidence of FPE.