

HIGH DOSE STREPTOKINASE FOR THROMBOLYSIS IN THE IMMEDIATE POSTOPERATIVE PERIOD: A CASE REPORT

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Abstract

Venous thrombo-embolism is a life threatening condition with often non specific presentation. The detection of massive pulmonary embolism in the intra and immediate post-operative period is not only difficult due to the variety of conditions with similar presentation, but the therapy for the same is complicated with concerns of surgical and intracranial bleeding precluding various options. We present a case of massive pulmonary embolism presenting as intraoperative hypotension with an increased alveolar to arterial CO₂ gradient which was subsequently managed with an accelerated regimen of streptokinase without increased postoperative bleeding. Accelerated regimen of streptokinase may be used as a safe low cost alternative modality in selected cases of massive pulmonary embolism in the immediate postoperative period.

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Venous thromboembolism (VTE) and Pulmonary embolism (PE) are one of the commonest preventable life threatening emergency of surgical patients having nonspecific presentation but, thrombolysis in the immediate post-operative period is contraindicated due to increased concerns of surgical and intracranial bleeding. The improvement in hemodynamics and gas exchange in massive PE is greatest in the first 48 hours of diagnosis¹. Although there is an overall decrease in the incidence of life threatening bleeding complications probably owing to an increased use of non-invasive modalities for the diagnosis of PE², there is little evidence on the use of thrombolysis in the immediate postoperative period. We present a case of pulmonary embolism with shock recognised in the immediate postoperative period successfully managed with accelerated dose of streptokinase after obtaining ethical committee approval and patient consent for publication.

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Case report

A 65 year old ASA-1 female (52 Kg weight), a follow up case of antrectomy, gastrojejunostomy and vagotomy for benign stricture of pylorus presented with symptoms of small gastric volume and dumping syndrome for which an operative exploration and adhesiolysis followed by total gastrectomy and feeding jejunostomy was planned. Patient did not have any underlying co-morbidity and was apparently healthy on the preoperative examination without any functional limitation but complained of weight loss and weakness due to the dumping syndrome. After ensuring overnight fasting, the patient was shifted to the operating room and large bore intravenous access obtained. The patient complained of anxiety during shifting on to the operating table. After attachment of ECG, NIBP and pulse oximeter, baseline tachycardia (HR 136 beats/min) was noted but presumed to be due to anxiety and possible dehydration. Her other vital parameters (BP of 126/84 and SPO₂ of 97%) were normal. A thoracic epidural was put for analgesia and right internal jugular vein cannulated for central venous pressure monitoring and fluid resuscitation. Initial CVP was low. After volume expansion with 500 ml of crystalloid patient was induced with IV morphine 6 mg, titrated dose of propofol 80 mg and vecuronium 6 mg to facilitate endotracheal intubation. A sudden hypotension was noted (72/40 mm Hg) soon after induction and was presumed to be due to exaggerated response to propofol and hence IV phenylephrine (100 µg) bolus was injected but did not improve the BP to normal levels and hence patient was immediately intubated and fluid bolus of 500 ml rapidly infused following which, the blood pressure came up to 116/72 mm Hg and HR settled. An invasive arterial blood pressure was transduced and an arterial blood gas analysis done which showed blood gas parameters with a Ph of 7.23, PO₂ of 130 (50% FIO₂), PaCO₂ of 46 mm Hg, HCO₃ of 20 Base deficit of -6 and an SAO₂ of 98% revealing an increased (A-a) O₂ and CO₂ gradient. The patient had stable intraoperative haemodynamics except increasing tachycardia which did not respond to fluid boluses or increasing depth of anesthesia and analgesia. End tidal CO₂ did not respond to changes in ventilatory strategies. Intermittent ABGs revealed increased (A-a) CO₂ gradient but oxygenation was

maintained. Anesthesia was maintained by oxygen and nitrous (50:50) with isoflurane titrated to 1 MAC and intermittent boluses of vecuronium titrated to train of four count < 2. The surgical course was uneventful. The total duration of surgery was about 3 hours following which patient was reversed for residual neuromuscular blockade at the end of anesthesia but the patient did not respond to verbal commands or painful stimuli even after about 45 minutes of stopping anesthetic agents and complete recovery of train of four counts. Pupils were normal and reactive to light. Suspecting possible intraoperative pulmonary thromboembolism the patient was transferred to PACU for postoperative ventilation and further management. Patient had persistent and increasing tachycardia and alveolar to arterial gradient of CO₂ and became hemodynamically unstable for which dopamine 5 µg/kg/min was started post-operatively. The cardiac markers were negative and twelve lead ECG was normal except for tachycardia and chest X-ray was unremarkable. Echocardiography revealed dilatation of right sided chambers with RV hypokinesia and hence suspecting pulmonary embolism, a pulmonary CT-angiography was performed which confirmed RV dilatation (Fig. 1) with bilateral pulmonary embolism extending from segmental branches of upper, middle & lower lobes (Fig. 2). After arranging blood products and informing the blood bank, patient was thrombolysed with 1.5 million units of streptokinase over half an hour without any bleeding episodes in the subsequent postoperative period. The patient was extubated after overnight ventilation. A search for the source of embolus revealed a DVT of left calf region on compression ultrasound without any physical evidence like swelling or warmth on examination. The patient sustained paroxysmal supraventricular tachycardia (HR of 230/min & hypotension of 60/40mmHg) in the next post-operative day which responded to carotid massage. The cause of PSVT was found to be hypokalemia which was subsequently corrected. Second day repeat ECHO showed improvement in RV hypokinesia although dilatation of RA and RV was still present. The rest of the hospital course was uneventful and the patient was subsequently discharged after 14 days of hospital stay.

Fig. 1

CT angiogram showing dilated right ventricle

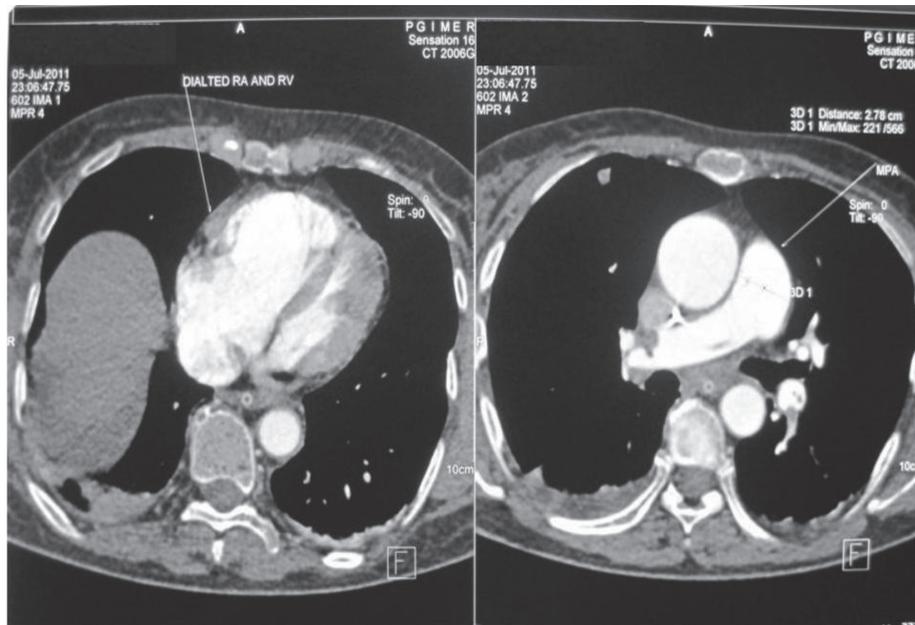
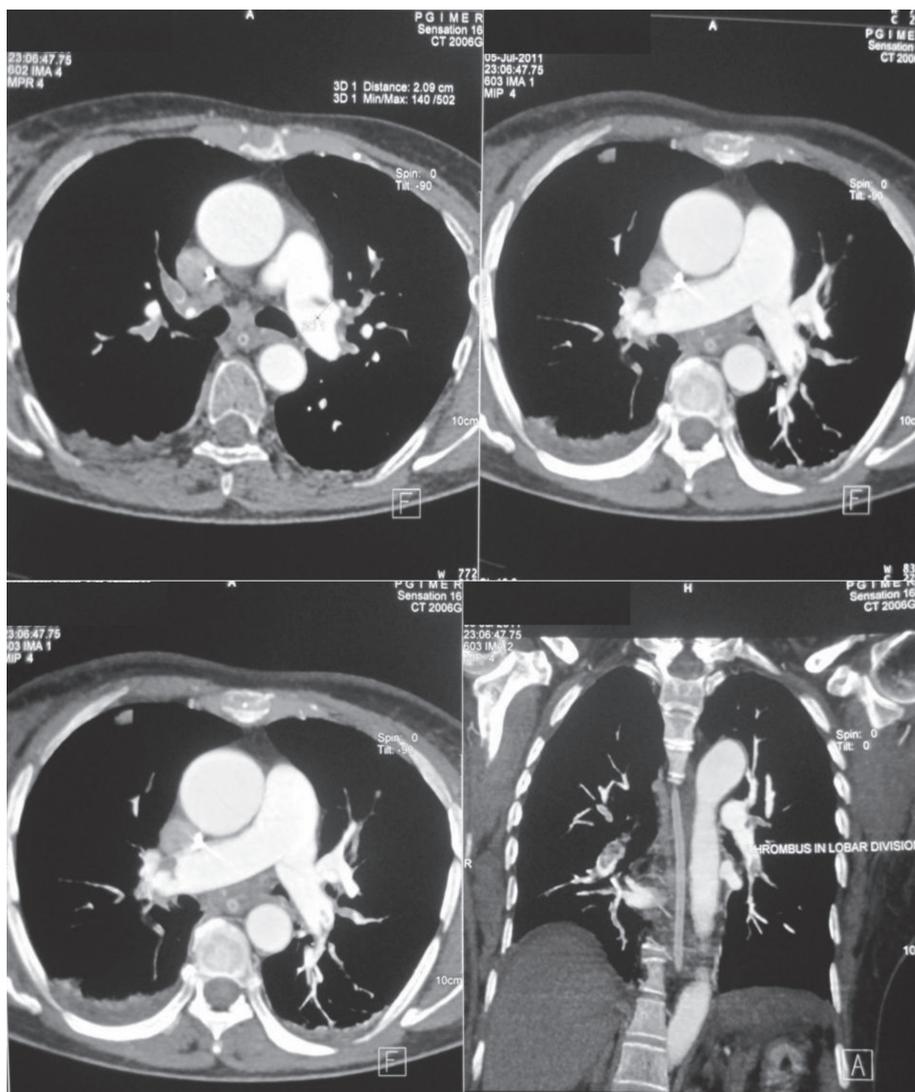


Fig. 2

pulmonary CT angiogram demonstrating bilateral pulmonary emboli starting from the lobar division.



Discussion

Our case represents a typical presentation of massive pulmonary embolism with high alveolar-arterial CO₂ gradient, increased pressures in the right heart chambers, delayed awakening probably due to systemic embolization from opening of foramen ovale with the condition further progressing to hemodynamic instability following right heart failure. Pulmonary thromboembolism (PE) is a frequent life threatening disorder presenting diagnostic difficulties. It is often unrecognized in upto 75% of cases and cadaveric studies have shown approximately 3% to 5% of the necropsies harbouring emboli in the pulmonary vessels³. The problem in early detection of VTE is the insensitivity of physical examination to detect it with even the most sensitive screening methods missing upto 30% of patients with PE⁴. Hence, a fairly high percentage of undetected DVT might have an associated asymptomatic pulmonary embolism. Around 30-50% blockade of pulmonary vasculature is necessary to produce hemodynamic instability and shock¹ the prognosis of which depends on the time to diagnosis and institution of appropriate management. Although immediate postoperative period is a relative contraindication for the performance of thrombolysis in acute PE, it might be a last resort in life threatening cases with severe right ventricular failure and shock. Usual doses of streptokinase recommended for pulmonary embolism (loading dose of 250 000 IU over 30 min, followed by 100 000 IU/h over 12–24 h) might take a longer duration for complete thrombolysis and hence accelerated regimens (1.5 million IU over 2 h) have been studied for utility. A study by MENEVEAU ET AL⁵ showed the safety and efficacy of a 2-h regimen of high dose streptokinase in improving cardiac output similar to high dose therapy with alteplase. With an

increasing evidence of inefficient thrombolysis in worsening early outcomes, goal of the thrombolytic regimens are to achieve complete thrombolysis as soon as possible which might be possible with accelerated regimens. One of the major concerns after thrombolysis is the occurrence of intracranial or surgical site bleeding which can range from 14% with older studies to around 4 % with the use of noninvasive methods used for diagnosis⁶. Hence a high dose streptokinase might be a life-saving option in massive pulmonary embolism. Although patients having major surgery were excluded in the study by Meneveau et al⁵, massive pulmonary embolism in immediate postoperative period may require thrombolytic therapy with considerations to the type of surgery, intraoperative course and pre-existing co-morbidity.

A major vascular, spine or neurosurgery, injury to a major vessel during the intraoperative course, or a preexisting cerebrovascular disease or previous stroke can preclude thrombolysis. These patients and others with contraindications to thrombolysis or those patients failing thrombolytic therapy might be better candidates for surgical thrombo-embolectomy. Although recent evidence suggests a decreasing bleeding complications and better survival rates with surgical embolectomy, intracranial bleeds and neurological events were similar with surgical or pharmacological therapies⁷.

Conclusion

To conclude, accelerated regimen of thrombolysis can be selectively utilized in massive pulmonary embolism associated with hemodynamic instability in the immediate postoperative period. Considerations to preoperative patient condition and type of surgery should aid in the decision making between surgical and pharmacological therapies.

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