A unique spectrum of deep vein thrombosis and pulmonary embolism; management guidelines

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ABSTRACT

Four peculiar cases of deep vein thrombosis (DVT) and pulmonary embolism (PE) are described. The first is Jellyfish venom induced DVT. The second case is anticaldriolipin syndrome in a young girl causing recurrent DVT and PE. The third case is duodenal erosion by a Greenfield filter and the fourth is a successful postpartum pulmonary embolectomy for massive pulmonary embolism.

Keywords: Jelly fish, venom, anticaldriolipin, greenfield, partum pulmonary, embolectomy.


Some new rare causes, procedures and complications of DVT and PE are reported in this paper for the first time in literature. Rare causes of DVT include Jellyfish venom and anticaldriolipin syndrome. Greenfield filter erosion into the duodenum is also a very rare complication. Postpartum pulmonary embolectomy complicated by spontaneous hepatic subcapsular hematoma is also described in this paper.

Case Reports. Case 1. A 35-year-old male was swimming in the Red Sea and felt a sting in the left leg by a jellyfish. The sting was painful and itchy. Three days later he noticed the swelling of his left leg. On examination, there was a small deep ulcerative lesion in front of the left medial malleolus and situated directly over the great saphenous vein. There was left calf swelling and tenderness. Venogram confirmed the presence of DVT extending to the mid-femoral vein. The patient was treated with anticoagulation and was discharged home on warfarin and elastic stockings. The ulcerative lesion healed gradually.

Case 2. A 14-year-old healthy girl was seen in the clinic complaining of spontaneous right leg and thigh swelling. Venogram showed DVT extending to the right common iliac vein. The patient was started on anticoagulation. A year later, she presented with left leg swelling. Repeat Venogram showed DVT in the left femoral vein despite her being on anticoagulation. Warfarin dose was increased to keep the INR (International Normalized Ratio) between 2 and 3. Unfortunately, she was not compliant with the treatment and few months later she was complaining of chest pain and shortness of breath. Isotope Lung Scan showed high probability of left pulmonary embolism. Despite adequate anticoagulation, she had several episodes of chest pain and shortness of breath with hypoxia and hypocarbia. A repeat Isotope Lung...
Scan showed multiple areas of ventilation perfusion mismatch correlating with recurrent PE affecting both lungs. Her chest Roentgenogram, electrocardiogram and echocardiogram showed signs of pulmonary hypertension and right ventricular hypertrophy. Serological tests revealed elevated levels of antcardiolipin antibodies, IgG of 150 unit/ml (normal less than 12) and IgM of 17 unit/ml (normal less than 6). Her anti-nuclear antibodies were also elevated ranging between 1:160 - 1:320. Anti-DNA antibodies were 8.9 (normal less than 4.2). Because of the nature of the disease, it was decided that she will not benefit from inferior vena cava filter and her anticoagulation was increased to keep her INR between 3 and 4.

Case 3. A 60-year-old male was admitted through the emergency room with hematemesis and melena. Past history revealed old DVT and recurrent PE for which he had Greenfield filter inserted in the inferior vena cava approximately four years ago. Following blood transfusion and resuscitation, endoscopy showed metallic spikes protruding into the duodenum. The patient was taken to the operating room and through midline laparotomy, vascular control of the inferior vena cava was gained and the fistula was exposed. The spikes were divided with wire cutter; the inferior vena cava and the duodenum were repaired. The omentum was used as an interposition tissue between the inferior vena cava and the duodenum.

Case 4. A 23-year-old healthy full-term pregnant female underwent Caesarean Section. Few hours later she arrested and was resuscitated and transferred to the Intensive Care Unit, ventilated on high doses of inotropic support including Dopamine and Adrenaline. She was hemodynamically unstable and a diagnosis of massive pulmonary embolism was made on the basis of the clinical picture, electrocardiogram, chest Roentgenogram and echocardiogram. She was fully heparinised. As she was deteriorating rapidly, she was taken to the operating room for emergency pulmonary embolectomy. Cardiopulmonary bypass was established using double venous cannulae with caval snare. Multiple large thrombi were extracted from both pulmonary arteries using forceps, suction, balloon catheter and lung massage. The patient was weaned off cardiopulmonary bypass successfully on small to moderate doses of inotropes. Her oxygenation improved dramatically. There was diffuse oozing from the mediastinum and sternal edges which decreased following protamine sulphate and fresh frozen plasma administration. Her abdomen was noticed to be swelling. Exploration of the Caesarean Section wound revealed large amounts of blood in the abdomen. The hysterectomy wound was clear and the blood was found to be trickling from above. The incision was extended cephalad and a ruptured hepatic subcapsular hematoma of the right lobe was found. The raw surface of the liver was cauterized and covered with hemostatic agents including surgicell and gelfoam. Drains were inserted and the abdomen was closed. She continued to bleed from the drains to the degree that affected her hemodynamics. The abdomen was re-explored and the raw surface of the liver was repacked with hemostatic agents and sponges. The abdominal wound was closed and the patient was transferred to the Intensive Care Unit. Following a stormy postoperative period, she was taken to the operating room, approximately twenty-four hours later, for removal of the sponges. The packs were removed and the liver surface was found dry. She was monitored in the Intensive Care Unit and covered with antibiotics. Anticoagulation with heparin was started on the third postoperative day. Venogram was done and showed no lower limb or pelvic DVT. Early postoperative days showed residual right ventricular high pressure most probably secondary to the humoral and mechanical responses to small distal emboli, so it was initially difficult to wean her off the ventilator. Tracheostomy was done on the third postoperative week which facilitated the weaning. She was transferred to the floor on the fourth postoperative week and discharged home on the sixth with warfarin to be continued for at least six months.

Discussion. Marine animals' venom causing DVT has not been mentioned before in literature. Venom reactions vary from mild to severe, local and general, and are sometimes fatal. There is no specific antidote for most marine venoms. Treatment of fish stings include local measures such as application of occlusive tourniquet and soaking the wound in hot water, since the venom is heat labile. General measures include administration of analgesics, antihistamines and calcium gluconate for muscle spasm. Severe systemic reactions may need cardiopulmonary support and resuscitation. The venom in our case had caused either endothelial damage that predisposed to thrombosis or local hypercoagulability. Swimmers and divers should be aware of such underwater enemies and should be prepared to recognize and avoid.

Case 2 is a very rare syndrome with elevation of both IgG and IgM antcardiolipin antibodies causing hypercoagulability and resulting in recurrent iliofemoral DVT and PE. Because of the natural history of antcardiolipin syndrome and the possibility of recurrent thrombi at...
different sites of the body and as she was not compliant with the treatment, it was decided, after discussion with the hematologist, that the insertion of the inferior vena cava filter would not be helpful and its risks would outweigh the benefit. There is also a possibility that these pulmonary emboli are primary pulmonary thrombi. Her antinuclear antibodies and anti-DNA antibodies were elevated but she did not have systemic lupus erythematosus. This syndrome is also known to cause miscarriages, prosthetic valve, cerebral, coronary and ophthalmic thrombosis. Anticardiolipin antibodies should be checked in all children with unexplained DVT.

Regarding the third case, we were not aware of a similar case of Greenfield filter erosion into the duodenum. It was difficult to remove the filter as it will entail inferior vena cava resection and use of an interposition graft that will carry a higher risk of morbidity and mortality on a critically ill patient.

The fourth case of postpartum pulmonary embolism was complicated by spontaneous subcapsular hepatic hematoma most likely caused by the diffuse coagulopathy induced by the heparin infusion and the cardiopulmonary bypass on top of the generalized body changes, the systemic humoral reactions and the bleeding diathesis associated usually with the postpartum state. Splinter and colleagues described the anaesthetic management of a similar case. The diagnosis was made on the basis of the clinical picture, electro and echocardiographic findings without an angiogram as the patient's condition was very critical and almost moribund. Rosenberg and colleagues reported the possibility of echocardiographic diagnosis and management of postpartum pulmonary embolism. Blegvad reported pulmonary embolectomy during second trimester pregnancy. Surgical treatment of massive postpartum pulmonary embolism is recommended. Surgeons should be prepared to deal with expected bleeding diathesis and should anticipate spontaneous intracavitary bleeding.

In conclusion the spectrum of DVT and PE is very broad covering a wide variety of causes, unusual presentation and affecting different groups and ages of patients. Multidisciplinary approach including physicians, cardiologists, cardiovascular surgeons, radiologists and hematologists is recommended to achieve better results. There are many active researches and studies on the homeostatic blood physiology and new circulating blood elements are discovered every day. The challenge remains.

References