



Spontaneous Intraabdominal Hemorrhage due to Segmental Arterial Mediolytic Following Influenza Vaccination

Shih-Hsien Yang¹, Hsin-Hung Shih^{1,*}, Yi-Ming Wang¹, Kuang-Wen Liu²,
Jen-Lung Chen³, Kai-Jen Lin⁴

We report a 40-year-old woman who presented with acute abdominal pain and pneumoperitoneum 18 days post-influenza vaccination. Descending colon perforation with peritonitis was diagnosed by exploratory laparotomy. The patient underwent unexpected re-bleeding events twice post-op (Post-OP Day 1 from round ligament of liver and Post-OP Day 7 left hepatic capsule). For hepatic laceration with massive bleeding, damage control operation was performed via left lateral two segmental hepatectomy, and hemostatic gauze packing. Subsequent abdominal computed tomography identified a pseudoaneurysm formation near hepatectomy resection margin, and pathological report of hepatectomy specimen confirmed the diagnosis of segmental arterial mediolysis. The pseudoaneurysm was treated successfully with trans-arterial embolization and good blood pressure control. This case report highlights a rare presentation of segmental arterial mediolysis, a rare but serious nonatherosclerotic, noninflammatory vasculopathy. A definitive diagnosis could be achieved by histological confirmation (to exclude other abnormal arteriopathy). Prompt and proper management and treatment can result in a satisfactory outcome.

Key words: segmental arterial mediolysis (SAM), abdominal arteriopathy, arterial aneurysm, spontaneous internal hemorrhage, influenza vaccination

Introduction

Segmental arterial mediolysis (SAM) is a rare but serious nonatherosclerotic, noninflammatory vasculopathy of unknown etiology that often results in aneurysm (76%), dissection (61%), arterial rupture (46%), occlusion, or stenosis of the abdominal arteries.¹ Spontaneous intracranial hemorrhage owing to SAM had also been reported.^{2,3} Meanwhile,

influenza vaccine is safe and effective for the general population as well as for patients with autoimmune diseases. However, although rare, vasculitis has been reported as an adverse event following influenza vaccination.⁴ Nevertheless, the relationships between vaccination and SAM was not documented from literature. Herein, we report the case of a patient with spontaneous intraabdominal hemorrhage due to segmental arterial mediolysis following influenza vaccination.

From the ¹Department of Critical Care Medicine, ²Division of Colorectal Surgery, ³Division of General Surgery and ⁴Department of Pathology, E-Da Hospital, I-Shou University, Kaohsiung, Taiwan.

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* Address reprint request and correspondence to: Hsin-Hung Shih, Department of Critical Care Medicine, E-Da Hospital, No.1, Yida Road, Jiaosu Village, Yanchao District, Kaohsiung City 82445, Taiwan
Tel: +886-7-615-0011 ext. 251752, Fax: +886-7-615-5352, Email: anemorover@gmail.com

Case Report

A 40-year-old female nursing staff in operation room without any known allergies received influenza vaccination as annual routine (without any previous vaccination-related adverse reactions). She denied any systemic diseases, recent interventional procedures, recent infections, or trauma history prior to immunization. She had cellulitis reaction noted 3 days after vaccination, the cellulitis took place at left elbow and right dorsal foot, which was located away from the injection area. She visited outpatient facility and was prescribed oral antibiotics along with local ointment treatment. Symptoms improved with

treatment. However, she developed left lower quadrant pain and soon progressed into diffuse abdominal pain on Day 18 post-vaccination. At the emergency department, patient was afebrile, but peritoneal sign was noted. Subsequent abdominal computed tomography (CT) revealed pneumoperitoneum, evident for hollow organ perforation. After exploratory laparotomy confirmation, peritonitis due to descending colon perforation was diagnosed, and Hartmann procedure was performed smoothly. However, patient underwent secondary hemostasis operation due to bleeding from round ligament of the liver on the next day. Further treatment was accomplished uneventfully with surgical repair, well drainage, and empirical antibiotics. Nevertheless, the patient had unexpected re-

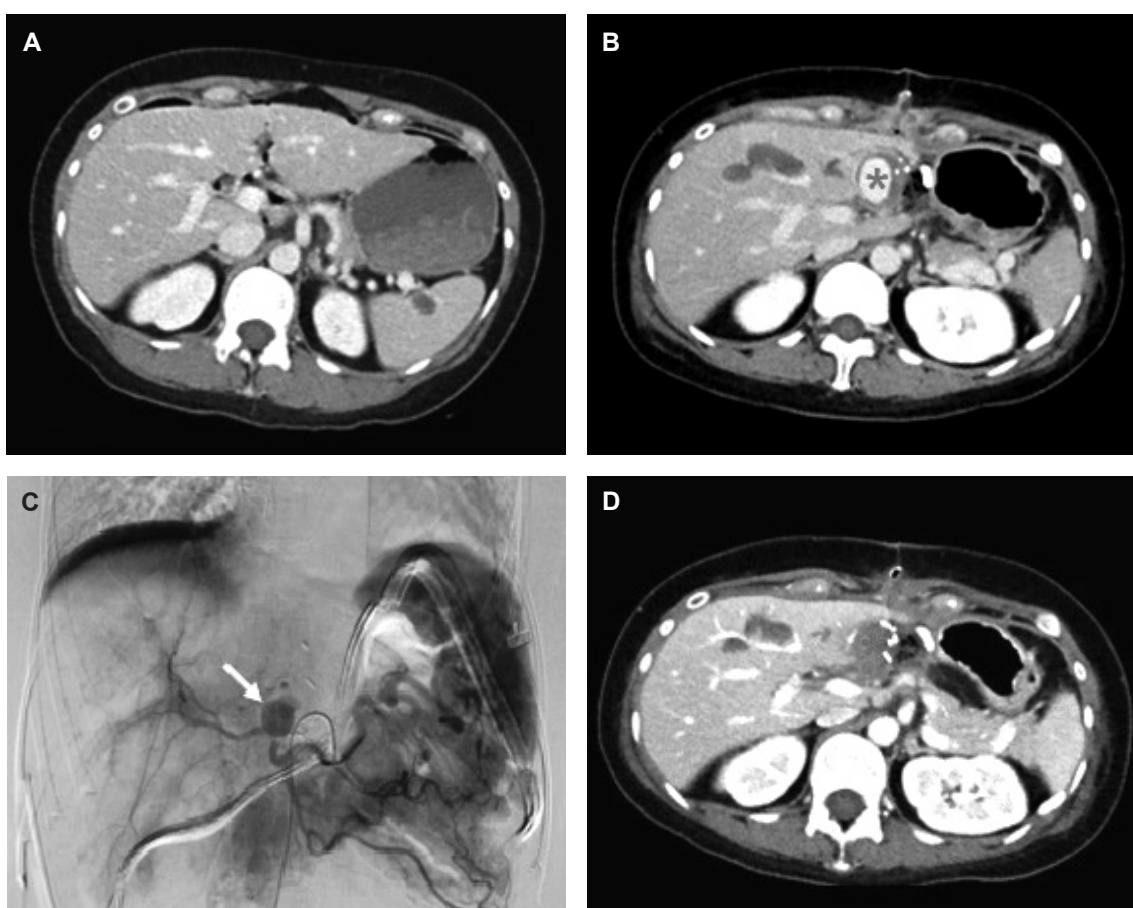


Fig. 1 (A) The computed tomography of abdomen at emergent department on Day 1 of hospitalization revealed normal hepatic vessel structure. (B) Sequential abdominal CT identified a pseudoaneurysm (asterisk) up to 2.1 cm near hepatectomy resection margin on post-hepatectomy Day 7. (C) Trans-arterial embolization for the pseudoaneurysm (arrow) from left hepatic artery branch on the same day. (D) Follow-up computed tomography angiography of abdomen revealed a thrombosed pseudoaneurysm without obvious residual filling (asterisk) on post TAE Day 6.

bleeding event during breathing exercise with Triflo II inspiratory exerciser at surgical ward on post-operative Day 7. An early recognition of active bleeding was established by fresh blood from Jackson-Pratt drain. Left hepatic capsule laceration with active bleeding was noted by immediate emergent damage control operation, including left lateral two segmental hepatectomy, and hemostatic gauze packing.

A detail review of the events determined there were no anti-coagulant, anti-platelet or medications influencing coagulation (such as heparin, warfarin, aspirin, clopidogrel, glycoprotein IIb/IIIa inhibitors, nonsteroidal anti-inflammatory drug (NSAID), selective serotonin reuptake inhibitor (SSRI), and Chinese herb). Throughout the post-operative course, the patient did not develop coagulopathy, and the coagulation profile was within normal range. Further workup for disorder of platelet function (acquired disorder of adhesion, aggregation, granule defects), von Willebrand disease (vWD) were done without positive finding. Autoimmune markers including rheumatoid factor, antinuclear antibody (ANA), extractable nuclear antigen (ENA), Anti-dsDNA (-),

cytoplasmic and perinuclear anti-neutrophil cytoplasmic antibody (cANCA, pANCA), lupus anticoagulant, antiphospholipid IgG, cryoglobulin were all negative. Only decrease levels of complement, C3 65.0 mg/dL (normal range 90 – 180), C4 8.9 mg/dL (normal range 10 – 40) were noted. Furthermore, the immunofixation electrophoresis (IIEP) examination had no monoclonal or oligoclonal immunoglobulin identified in serum. Septic workup and cytomegalovirus antibodies yield negative finding. She had no findings to support a vasculitic process, nor a concern for infectious etiologies. She required a thoughtful approach and detailed imaging to complete further diagnose. Subsequent abdominal computed tomography identified a pseudoaneurysm up to 2.1 cm near hepatectomy resection margin (Fig. 1), and pathological report of hepatectomy specimen confirmed the diagnosis of segmental arterial mediolysis (Fig. 2). The pseudoaneurysm was treated successfully with trans-arterial embolization (TAE) (Fig. 1), medications (tranexamic acid, somatostatin) and good blood pressure control.

Because spontaneous intracranial hemor-

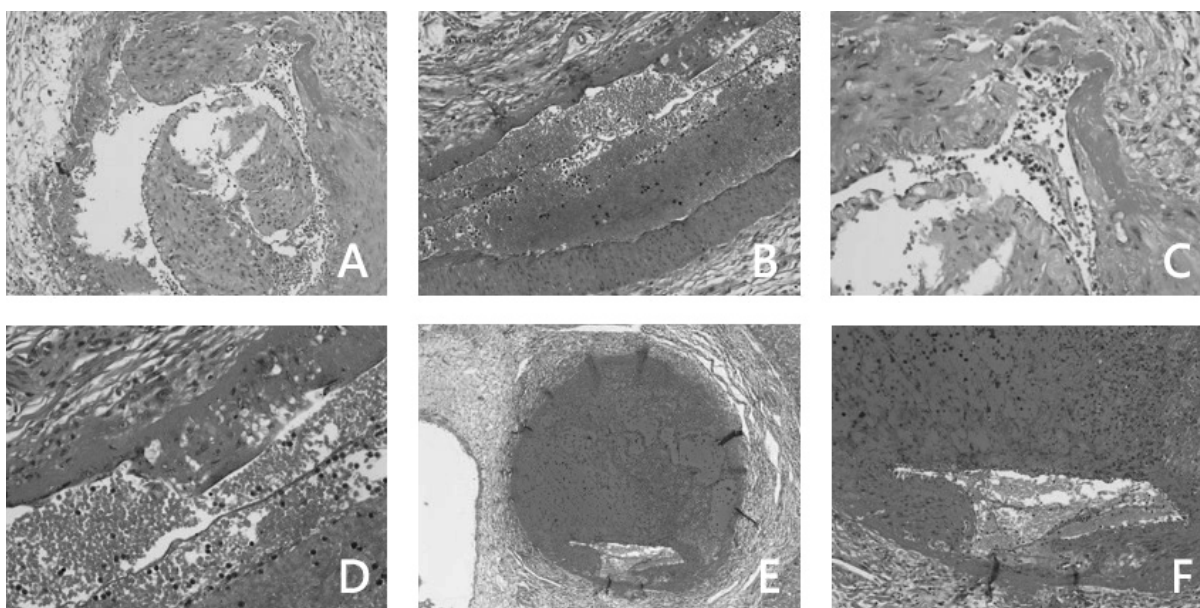


Fig. 2 (A,B) Mediolysis leads to gaps formation of artery wall and bordered by fibrin. (100 magnification, H & E stain) (C,D) Vacuolization of smooth muscle cells is evident. (200 magnification, H & E stain) (E,F) Dissecting hematoma between media and adventitia of an artery. (E - 40 magnification; F - 100 magnification, H & E stain)

rhage owing to SAM had also been reported.^{2,3} We then arrange brain magnetic resonance imaging to for the surveillance to exclude other abnormal arteriopathy, and intracranial vessel structure was intact. After the timely diagnosis of intraabdominal SAM with arterial pseudoaneurysm managed endovascularly, the patient had made a complete recovery with no recurrent bleeding. An early recognition, prompt diagnosis and adequate intervention resulted in a satisfactory outcome. The patient was discharged from hospital without sequelae after hospitalization for 28 days.

Discussion

Influenza vaccine is widely considered safe and effective for the general population. Common side effects from the flu vaccine include soreness, redness, and/or swelling around the injection site. Other possible side effects include headache, fever, nausea, and muscle aches. Rare side effects are viral encephalopathy, autoimmune reaction (such as Guillain-Barré syndrome), and reactions related to egg allergy. Our patient initially presented as descending colon perforation. Diverticular disease was suspected but not proved intraoperatively. Vaccination could be a behavioral and environmental factor variate in the incidences of diverticulitis from different areas, but this is still statistically insignificant ($p = 0.3$).⁵

After initial Hartmann procedure of descending colon, further hospitalization course was complicated with spontaneous hepatic bleeding. Based on literature, spontaneous hepatic hemorrhage may be associated with etiological conditions of pediatric, pregnancy, malignant neoplasm, benign adenoma, vascular, connective tissue disease, systemic amyloidosis, bleeding tendency or systemic lupus erythematosus.⁶ Prior to pathological diagnosis, visceral abdominal aneurysms can originate from multiple disease states, including inflammatory, non-inflammatory and in-

fectious etiologies. It is important to follow a stepwise approach to make the correct diagnosis, because disease prognosis and management can be substantially different. Although rarely vasculitis following influenza vaccination has been reported, we performed a complete hematological and rheumatological workup. Therefore, all the negative findings could exclude the diagnosis of ANCA-associated vasculitis, post-influenza vaccination-reactivated IgA vasculitis, or rheumatoid vasculitis.^{4,7}

Segmental arterial mediolysis is an uncommon, non-atherosclerotic, non-inflammatory arteriopathy that involves areas of dissecting aneurysms and strictures that are caused by outer media lysis of the arterial wall from areas of medial necrosis of uncertain pathogenesis. It has a predilection for splanchnic arteries and often presents as abdominal pain or hemorrhage in late middle-aged and elderly patients. Patients with SAM were most commonly men (68%) in their 60s. Hypertension (43%), tobacco use (12%), and hyperlipidemia (12%) were common comorbidities.¹ Diagnosis can be established by computed tomography angiography, magnetic resonance angiography, or angiogram by visualizing typical abnormalities, in addition to excluding other vasculitis. Histological confirmation is the gold standard but is not easily accessible and, as such, is not frequently performed.⁸⁻¹⁰ Diagnosis is important because immunosuppressants for vasculitis can worsen the arteriopathy. Segmental arterial mediolysis can be self-limiting without treatment or may require urgent surgical or endovascular therapy for bleeding and carries a 50% mortality rate if delayed diagnosis and complicated with hypovolemia, hypoperfusion. Therefore, it should be included in the differential of causes of abdominal pain as well as in cases of unexplained abdominal hemorrhage.

In conclusion, this case report highlights the rare but important possibility of segmental arterial mediolysis. Through our case and discussion, we describe the importance of rec-

ognizing this rare entity and of understanding how early recognition can save patients from significant morbidity and unnecessary potential harmful therapeutic options.

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