

Right Common Iliac Artery Aneurysm Rupture presenting as Hematochezia due to Probable Radiation-induced Arteritis: A Case Report

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Abstract Background: Hematochezia is a common presentation that typically indicates a lower gastrointestinal pathology. The differential diagnoses for lower GI bleed include malignancy, inflammatory bowel disease, hemorrhoids, diverticulosis, ischemic colitis, arterio-venous malformations etc. Rarely is a ruptured iliac artery associated with a lower GI bleed. **Case Report:** A 45-year-old woman with metastatic squamous carcinoma of the cervix status post External Beam Radiotherapy, High Dose Rate Brachytherapy, diverting loop ileostomy and takedown due to sigmoid perforation presented with acute onset hematochezia complicated by hemorrhagic shock and pulseless electrical activity arrest with Return of Spontaneous Circulation following volume resuscitation with crystalloids, blood products, CPR and epinephrine. Sigmoidoscopy revealed active bleeding at the recto-sigmoid junction. CT Aortography revealed right common iliac artery aneurysm rupture with contrast extravasation in the pelvis. She successfully underwent stenting of the right common iliac artery with cessation of contrast extravasation. Unfortunately, the patient died due to her complicated clinical course. **Conclusion:** Radiation arteritis can result in peripheral arterial disease, coronary artery disease, stroke, subdural hematoma and spontaneous arterial rupture. In the appropriate context, it carries a high mortality risk if missed. Clinicians should have high suspicion of radiation induced arterial injury in patients who have undergone radiotherapy.

Keywords: hematochezia, arteritis, radiation, rupture, loop ileostomy, External Beam Radiotherapy (EBRT), High Dose Rate (HDR) Brachytherapy, cancer

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1. Background

The evolution of cancer treatment has been quite remarkable as new modalities and treatment options are constantly emerging. These include chemotherapy, radiation therapy, immunotherapy and surgery. Scientists and clinicians have made efforts to minimize the adverse effects of cancer treatments, however this remains a challenge. Adverse effects of radiation therapy include endothelial vascular injury such as atherosclerosis and arteritis which can lead to peripheral arterial disease, coronary artery disease, stroke, subdural hematoma and spontaneous arterial rupture. The timeline of radiation-induced vascular injury remains unclear and therefore requires much attentiveness due to increased morbidity and mortality.

2. Case Presentation

A 45-year-old woman with metastatic squamous carcinoma of the cervix had successfully undergone pelvic lymphadenopathy, oophorectomy and chemoradiation with Cisplatin, External Beam Radiotherapy and High Dose Rate Brachytherapy. In the interim, she was found to have ureteral obstruction, sigmoid perforation and radiation proctitis 3 years following diagnosis of cervical cancer and underwent bilateral nephrostomy tube placement, Hartmann's procedure, colostomy dilatation for ostomy retraction, Hartmann's closure with diverting loop ileostomy and takedown of her ileostomy. She initially presented to our institution with lethargy and altered mental status. Her clinical course was complicated by acute onset hematochezia and hypovolemic shock. She

was transferred to the ICU immediately and management included hemodynamic support with Norepinephrine, phenylephrine, blood transfusion, crystalloid infusion and endotracheal intubation with full mechanical ventilation support. While in the ICU, she went into pulseless electrical activity arrest multiple times however attained Return of Spontaneous Circulation after less than 10 minutes of CPR, epinephrine and large volume resuscitation with crystalloids, packed red blood cells, fresh frozen plasma, platelet and cryoprecipitate. Unfortunately, hematochezia persisted with significant hemodynamic changes and rapid decrease in hemoglobin.

1.1. Diagnostic Investigation

A bedside Upper endoscopy revealed acute gastritis with non-bleeding gastric ulcer. A flexible sigmoidoscopy revealed active bleeding from the proximal rectum concerning for radiation proctitis versus anastomotic bleeding (Figure 1, Figure 2). CT Aortography revealed distal right common iliac artery aneurysm rupture thought to be most likely secondary to radiation arteritis (Figure 3, Figure 4).

1.2. Treatment

Interventional Radiology successfully performed repair of injured right common and external iliac arteries with stent graft and patient attained resolution of hematochezia (Figure 5).

1.3. Post-treatment

Due to her complex medical issues, she unfortunately died despite our maximum efforts.

2. Images

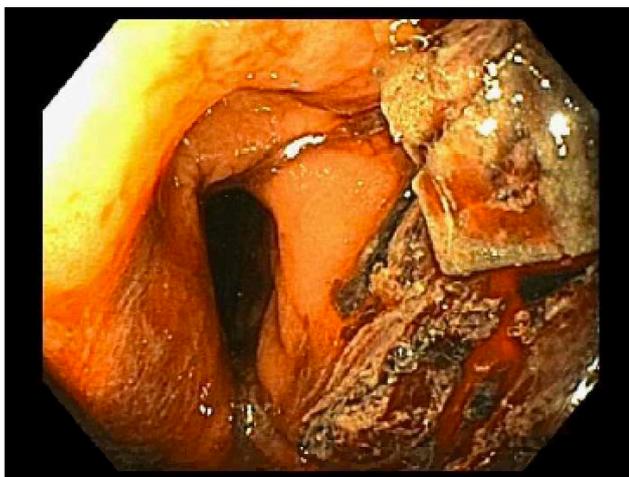


Figure 1. Sigmoidoscopy reveals abnormal mucosa at the rectosigmoid junction

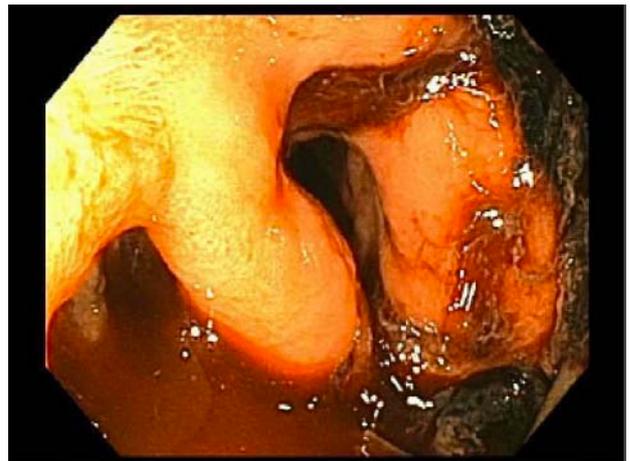


Figure 2. Sigmoidoscopy reveals site of anastomosis with active bleeding

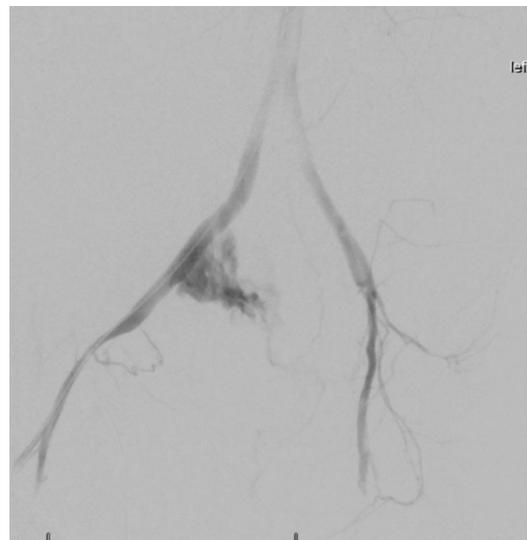


Figure 3. CT Aortography shows ruptured right common iliac artery aneurysm with contrast extravasation into the pelvis.

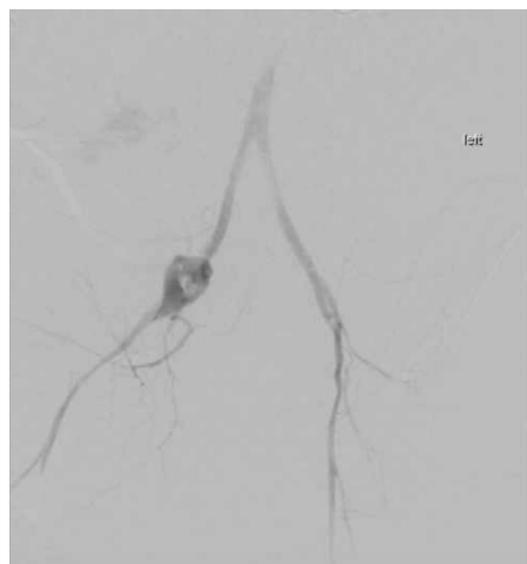


Figure 4. CT Aortography shows aneurysm of right common iliac artery.

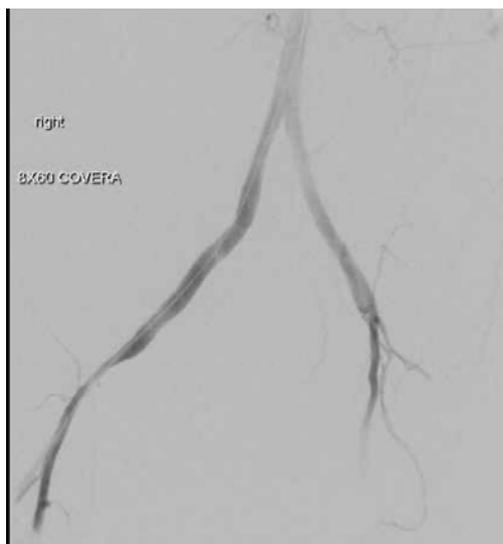


Figure 5. CT Aortography shows right common iliac artery after repair with an 8mm self-expanding Covera stent graft.

3. Discussion and Conclusion

Radiation therapy has become a valued addition and a standard of care for cancer treatment. It is estimated that around 50% to 60% of patients with cancer undergo radiation therapy [3]. The adverse effects associated with radiation therapy include diarrhea, skin changes, dysphagia, odynophagia, sexual and fertility changes, fatigue, hair loss, urinary incontinence, bladder incontinence and vascular injury. Radiation-induced arterial injury is a well-known phenomenon which typically occurs in patients who undergo External Beam Radiotherapy (EBRT) [2]. The types of arterial injuries are accelerated atherosclerosis, arteriosclerosis, necrotizing vasculitis, occlusive thrombosis and arteritis. The acute effects of radiation on endothelial cells can occur within days to weeks through apoptosis, while chronic changes can occur within months to years through senescence [3]. One report estimated of an 11.7% incidence of internal carotid artery and common carotid artery stenosis among patients who underwent radiation to the head and neck 72 months after treatment [1]. The rate of mitotic cell death within the vascular bed is dose dependent meaning higher doses of radiation typically induce immediate cell death [3,6]. Injury to the vasa-vasorum plays a crucial role in the overall histologic changes of radiation injury [6]. Furthermore, pseudoaneurysm and arterial rupture can occur following radiation therapy. Our patient was a 45-year-old woman with an extensive medical and surgical history who underwent EBRT and HDR Brachytherapy for metastatic cervical cancer. She developed cecal perforation and underwent Hartmann's procedure with diverting loop ileostomy and takedown of her ileostomy approximately 3 months prior to admission to our facility. It is important to note that Ileostomy takedown carries several complications such as small bowel obstruction, wound infection, anastomotic leak,

bleeding and enterocutaneous fistula [10,11]. Our patient experienced an acute onset large volume hematochezia leading to hemorrhagic shock and was managed with large volume IV crystalloid infusion and blood transfusion. She was found to have right common iliac aneurysm and rupture on CT angiography. The exact etiology of her acute onset hematochezia remains unclear presently. Given that she developed hemoperitoneum after receiving crystalloids and blood product infusion, one theory we are postulating is that an increase in intra-abdominal pressure had caused leakage of blood through her surgical anastomosis. The idea of an arterio-enteral fistula had been proposed; however, the CT aortography showed no evidence of a fistula. Radiation induced arteritis is certainly not a benign condition. Our patient had completed her course of radiotherapy 68 months ago but had not exhibited any signs or symptoms of arterial injury in the interim. There are currently no screening guidelines for radiation arteritis and diagnosis is solely based on clinical suspicion and arteriography. Given the high mortality rate of a missed spontaneous arterial rupture, clinicians should have high suspicion of radiation-induced vascular injury in any patient who has undergone EBRT.

List of Abbreviations

External Beam Radiotherapy (EBRT), High Dose Rate (HDR) Brachytherapy, CPR (Cardiopulmonary resuscitation).

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