

Relationship of Emergency Physician and Interventional Radiologist in Emergency Department: Repair Initiative.

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Abstract

There is a major role of an interventional radiologist in the emergency department for both diagnosis and emergent interventions. We discuss three different cases presenting to our emergency department with melena, hemoptysis and a stuck guide wire. All cases with varied presentations were initially evaluated and diagnosed in the emergency room and immediate interventional radiology help was sought. All the three cases were successfully managed and dis-charged from the emergency department.

Many of the medical conditions and trauma can present as emergency and require immediate intervention. Involving an interventional radiologist early during emergencies has inspired us to develop the REPAIR initiative where colla-boration of the two specialities has led to remarkable outcomes. It has resulted in significant decrease in morbidity and mortality as well as the length of hospital stay.

Keywords: Emergency department; Interventional radiolog;, Melena; Hemoptysis.

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Introduction

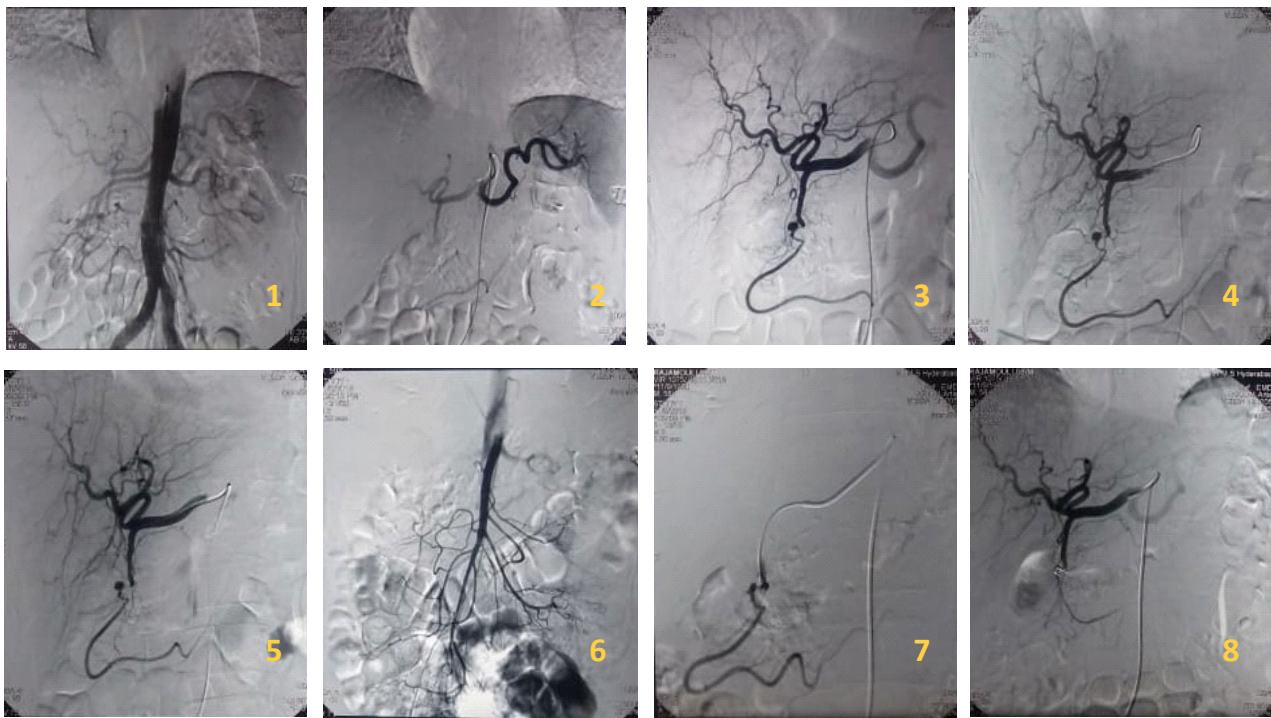
There is a major role of an interventional radiologist in the emergency department for both diagnosis and emergent interventions. We will be highlighting the relationship between the two specialities by discussing a few cases which presented to our emergency department and were successfully managed.

Case Discussions

Case 1: A 32 year male, known case of alcoholic liver disease, presented to ED with complaints of abdominal pain and dark colored stools since 3 days. Abdominal pain was crampy and intermittent

following melena. There was no history of vomiting, constipation, loose stools, hematemesis, fever, chest pain or shortness of breath. There was no significant past history. On arrival patient was hemodynamically stable, pallor was noted. ECG showed normal sinus rhythm and on arterial blood gas analysis, compensated metabolic acidosis with hyperkalemia was noted for which correction was given. Hemoglobin was 6 gm% for which packed cell transfusion was given improving it to 9gm%. Upper GI endoscopy was done which was normal and later abdominal CT angiography showed a gastro-duodenal artery (GDA) aneurysm (Fig - 1) for which interventional radiology consultation was taken. The patient was immediately shifted





1. Aortogram 2. Selective cannulation of splenic artery. 3, 4, 5. Aneurysm of gastroduodenal artery. 6. Coiling of aneurysm. 7, 8. Check angiogram showing complete obliteration of the flow into aneurysm post embolisation.

Fig. 1: An aortogram showing the pre and post coiling images of the gastroduodenal artery aneurysm.

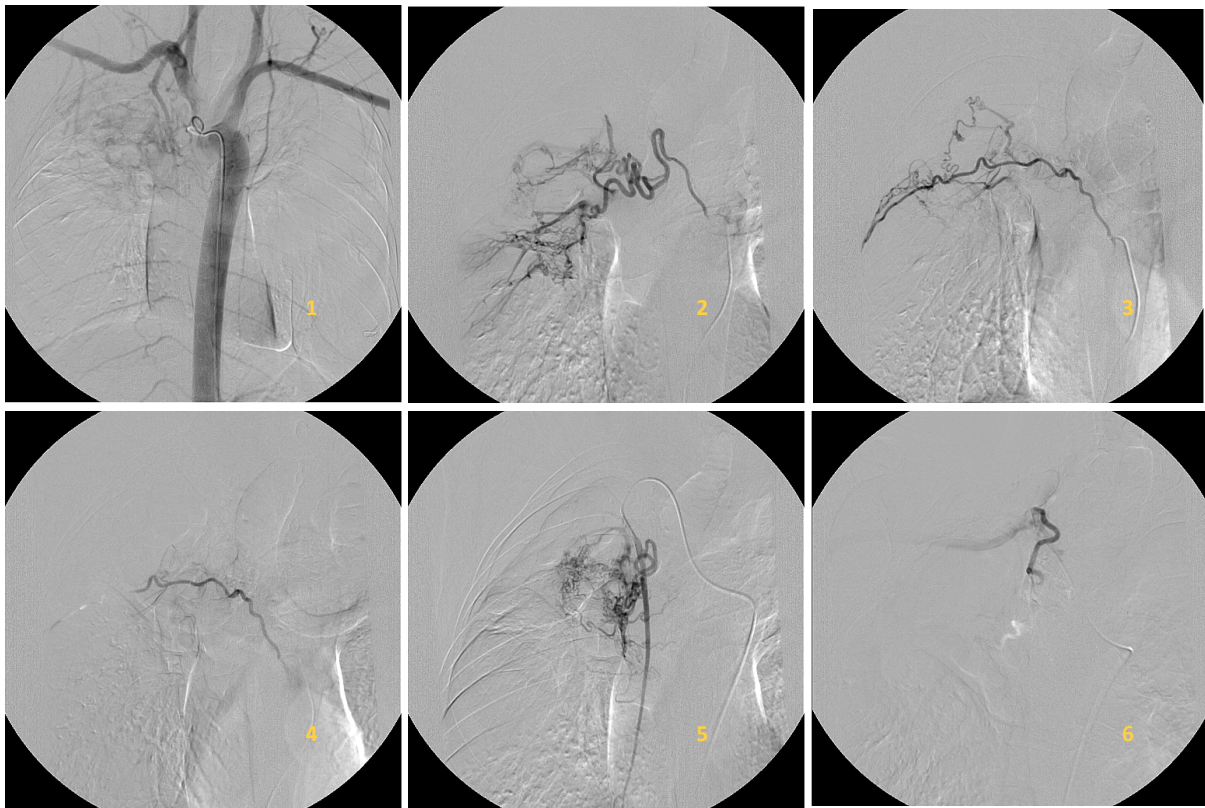
to the digital subtraction angiography lab and angioembolization was done. Patient improved symptomatically and was discharged in hemodynamically stable condition to be followed up in medical gastroenterology OPD.

Case 2: A 45 year male, known chronic smoker with a history of old treated Pulmonary Tuberculosis 10 years back, presented with complaints of coughing out fresh blood nearly 300-400ml thrice since morning followed by blood streaking sputum. On arrival patient was tachypneic and tachycardic with room air saturation of 70 % and BP -110/70. Started on supplemental oxygen therapy. Pallor was noted. ABG-compensated metabolic acidosis. ECG-normal sinus rhythm. Hb-9gm% CXR was suggestive of right upper lobe cavitary lesion correlating with the old history of PTB. Patient was immediately taken up for bronchial artery embolization (Fig - 2) by interventional radiology within 6hours of arrival to ED. Patient's condition improved and was discharged to be followed up in respiratory medicine OPD.

Case 3: 50 year female known case of chronic kidney disease on maintenance hemodialysis (MHD) thrice weekly since 4 months, last MHD done three days back was brought to ER with a guidewire stuck below the right clavicle. She was admitted to an outside hospital in view of grade 4 shortness

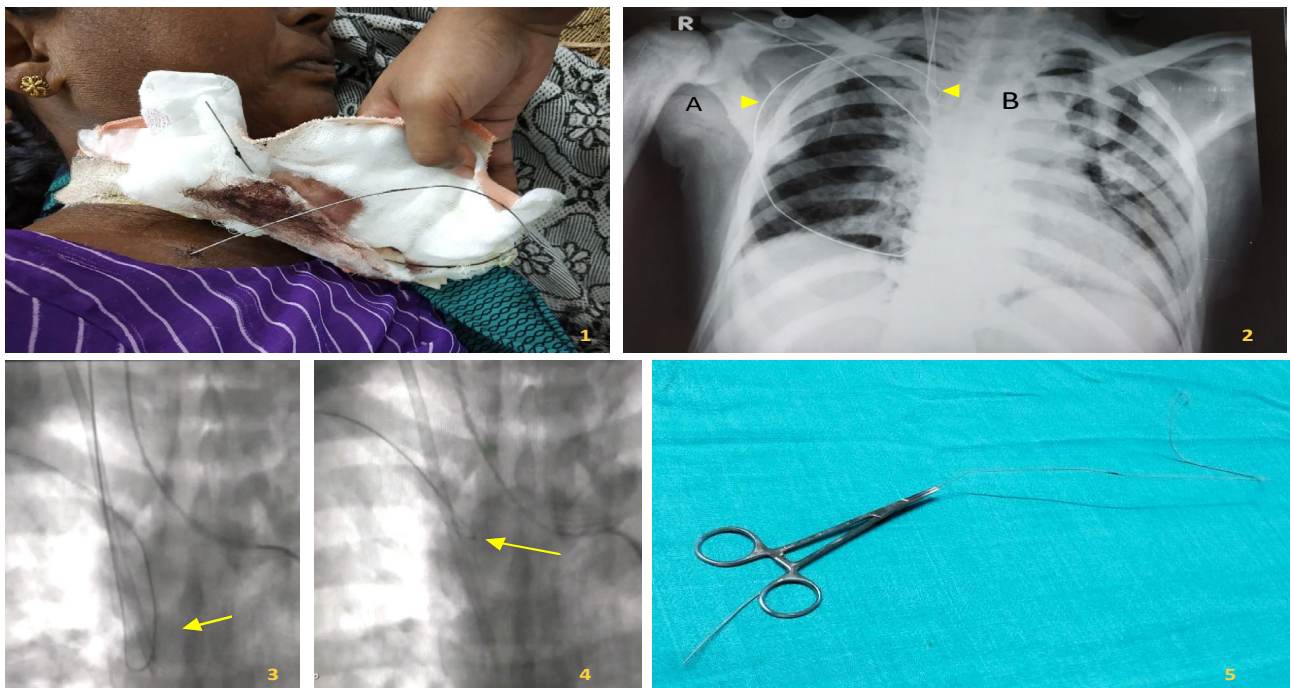
of breath and decreased urine output since 1 day. Doctors over there tried to secure a right subclavian vein access for hemodialysis, as her fistula had failed. During the procedure, the cannula got stuck and they found that the guidewire had kinked and gone up into the right internal jugular vein. They had referred her to a tertiary healthcare center for further management.

On arrival to ER her airway was patent, breathing spontaneously at a rate of 18/min and saturation at room air was 98%, pulse rate of 80/min and blood pressure of 120/70 mmHg. Random blood sugar was around 120mg/dl. On exposure, there was a guidewire coming out below the right clavicle and a dressing applied over it. ABG was ordered which showed mild metabolic acidosis and hyperkalemia for which correction measures were initiated. ECG was normal, no hyperkalemic changes were noted in ECG. Chest X ray was done. Point of care (POC) testing for serum creatinine was 5.6 mg/dl. As an emergency physician, our concern was what do we do next? Vascular surgery and interventional radiology help was sought. Under continuous cardiac monitoring and fluoroscopic guidance, decision was taken to push the guidewire back inside, so that the loop becomes bigger and unwinds in superior vena cava so that it can be taken out through the same site of insertion. The entire length of the guidewire could be retrieved



1. Aortogram. 2. Showing right bronchial artery. 3. Postembolisation of right bronchial artery. 4, 5, 6. Intercostal artery pre- and post-embolisation.

Fig. 2: An aortogram showing the pre and post embolization images of right bronchial and intercostal arteries.



1. Picture depicting a major portion of guidewire loop. 2. Chest X ray showing 2 coils of the guidewire, A-larger loop, exposed outside and B-smaller loop which has kinked inside and gone into the ipsilateral internal jugular vein (IJV). 3. The end exposed outside being slowly forwarded into the superior vena cava. 4. Last part of the guidewire being retrieved through the subclavian vein of same side. 5. Entire length of guidewire after the retrieval.

Fig. 3: Images depicting the stuck guide wire being retrieved through the subclavian vein.

from the right subclavian vein itself (Fig. - 3). Entire procedure was uneventful. And the patient was discharged home after a day of observation and one hemodialysis session.

Discussion

Interventional radiology is a sub-specialty of radiology which utilizes minimally invasive image-guided procedures to diagnose and also to treat diseases in nearly every organ system (vascular, gastrointestinal, hepatobiliary, genitourinary, pulmonary, musculoskeletal, and, the central nervous system).^{1,2} If there is persistent bleeding despite medical and endoscopic treatment then the role of interventional radiology becomes crucial.³ Patients with massive hemoptysis have higher risk of aspiration and asphyxiation, so protecting the airway and optimizing oxygenation should be the priority in management and later bronchial artery embolization can be done with a high initial rate of success. It is a safe and effective method for massive hemoptysis treatment.⁴ According to Velmahos et. al. angiographic embolisation of bleeding from intraperitoneal or retroperitoneal injuries should stop bleeding in more than 90% of cases and is a better alternative to open surgery in many cases.⁵ There is a 95% success rate for retrieval of embolized central venous catheter fragments by interventional radiology procedures.⁶ Resuscitative endovascular balloon occlusion of the aorta (REBOA) is designed as an adjunct to successfully elevate central blood pressure in the setting of shock and sustain the circulation until definitive hemostasis. It is used in cases of torsohemorrhage which remains the leading cause of potentially preventable death due to trauma.⁷ Acute thromboembolic occlusion of the superior mesenteric artery (SMA) is a life-threatening condition and despite advances in surgical techniques, mortality remains high. Therefore percutaneous revascularization remains an alternative to surgical reconstruction in patients with acute SMA occlusions who have no signs of advanced bowel ischemia.⁸ Availability of mobile angiography immediately in the ED has shown to be a safer and effective measure for hemodynamically unstable trauma patients with pelvic injury and has resulted in rapid improvement in resuscitation intervals without the need to leave ED.⁹ It minimizes risk to the patient, has lesser pain and shorter recovery time in comparison to open surgery and improves the health outcomes.

Conclusion

Many of the medical conditions and trauma can present as emergency and require immediate intervention. Involving an interventional radiologist early during emergencies has inspired us to develop the Repair initiative where collaboration of the two specialities has led to remarkable outcomes. It has resulted in significant decrease in morbidity and mortality as well as the length of hospital stay.

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Conflict of Interest: None

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