Abstract

We report a case of an incidentally detected aortic aneurysm in the ICU. We discuss the presentation of the patient, the endovascular repair of the aneurysm, the intensive care management, the evidence dictating the choice of therapy and the associated problems.

Keywords — Thoracic aortic aneurysm, pleural effusion, endovascular technique

Our Experience

A 67 year male patient presented with history of cough and breathlessness to the Emergency Room (ER). Patient was a known case of Type 2 Diabetes, Hypertension, Hypercholesterolemia and Chronic Kidney Disease on treatment. After initial stabilization in the ER he was shifted to the Intensive care unit (ICU). His initial chest X ray (CXR) showed a large left pleural effusion with mediastinal shift (Figure 1).

We describe a case of aortic aneurysm presenting as massive pleural effusion to the intensive care unit. We describe the presentation, the endovascular management and the problems encountered.

Introduction

Most aortic aneurysms are detected incidentally in patients presenting for other illnesses. The prevalence of thoracic aortic aneurysms is in the order of 3-4% in individuals older than 65 years. Aneurysms of the thoraco-abdominal aorta are primarily due to atherosclerotic degenerative disease (80%) and due to chronic aortic dissection in the remaining 20%. The morbidity and mortality from aortic aneurysms is significant and death from aneurysmal rupture is one of the fifteen leading causes of death in most series.

Intensive care management of a patient presenting with aortic aneurysm is complex and requires a team approach with involvement of other important subspecialties such as Interventional Cardiology and Cardio-thoracic surgery. Therapeutic options have also expanded in the recent past with the advent of endovascular stents.

We describe a case of aortic aneurysm presenting as massive pleural effusion to the intensive care unit.
which drained 500 ml of straw coloured fluid and the patient improved symptomatically. The pleural fluid on analysis showed an exudate. The repeated CXR displayed a persistent large pleural effusion with mediastinal shift and an appropriately placed pig tail.

The patient however had never experienced any symptoms due to aortic aneurysm. An echocardiogram was performed and it was essentially normal. In view of the aneurysm, an interventional cardiologist and cardiothoracic surgeon were consulted. In view of the patient’s clinical status and other co-morbidities, a joint decision was taken by the team, in consultation with the family to proceed for an endovascular stent. A Valiant® stent graft was successfully placed by the Cardiologist and the Surgeon inserted an intercostal drainage (ICD) tube. The procedure was uneventful. Post-procedure patient was transferred back to the ICU and an Xray was done. The Xray showed the ICD and the stent in place (Figure 4).

The patient improved and was stable for the next three days in the ICU and was transferred to the floor. On the morning of the fourth post-procedure day, the patient had a cardiac arrest with a massive bleed and significant drainage through the ICD. The patient was aggressively resuscitated, but unfortunately could not be revived. The most likely cause seemed to be an endoleak with aneurysmal rupture, which although uncommon is a known complication of this procedure.

Discussion

There are significant learning points that emerge from this case. Most aortic aneurysms are detected incidentally. A very small subset of patients presents with symptoms such as back pain and a few present directly with rupture. But, our case presented as difficulty in breathing with massive reactive pleural effusion.

There have been many reports of patients presenting with painless haemorrhagic pleural effusion due to an aneurysmal leak. In our patient, the effusion was not haemorrhagic. There were no red cells in the pleural fluid analysis. This could be explained as a coincidental exudative effusion. However in the setting of such a large aneurysm, the presence of a leak must be strongly considered. The only point that goes against a leak is the lack of red cells in the pleural fluid. This can be explained if a small leak has sealed off and has produced a reactionary exudative effusion.

This case highlights the need to be cautious when a thoracocentesis is considered in these patients and the need for us to approach our differential diagnosis with an open mind. The initial Xray showed a massive effusion; however the mass could not be visualized and the pigtail catheter had to be placed as the patient was symptomatic with a large effusion. We were fortunate not to encounter any problems.

The other important issue that this case raises is the choice of therapy. In the presence of multiple comorbidities and in view of the patient’s condition, a joint decision was taken by the Cardiologist and the Surgeon to go for an endovascular stent graft. Endovascular stent graft has become a major therapeutic alternative to open surgery. The minimal access, ability to stent large aneurysms, its usefulness in the presence of multiple comorbidities, has made it an attractive choice.

![Fig. 2.](image1)

This CXR also revealed a mass like lesion on the left side of the mediastinum (Figure 2). Therefore, a computed tomography (CT) thorax was sought and the CT revealed a large pleural effusion and a well circumscribed mass. The exact origin of the mass could not be delineated; however it seemed to be originating from the thoracic aorta (Figure 3). A CT aortogram was done and it showed a saccular aneurysm (measuring 7 cms) at the midthoracic aorta with ectasia of the infrarenal aorta and diffuse atheromatous changes involving the entire aorta.

![Fig. 3.](image2)
Whether the endovascular aortic repair (EVAR) is superior to open repair, however remains controversial.

In a multicentre trial, Bavaria and colleagues compared patients undergoing endovascular thoracic aortic repair with a surgical cohort; they found that peri-op mortality was 2.1% versus 11.7% in the surgical cohort. There was also a significantly lower incidence of complications such as renal insufficiency, spinal cord ischemia and respiratory failure. The mean length of hospital stay and ICU stay was lower in the endovascular group. However at two year follow up they found incidences of endoleaks and requirement for re-interventions.

Greenberg and colleagues compared endovascular repair with open surgical repair in patients with thoraco-abdominal aneurysms. They analysed a consecutive cohort of patients with thoracic and thoraco-abdominal aneurysms treated electively with endovascular or surgical technique. Mortality at 30 days and 12months was similar between the two groups. Only a borderline difference (p=0.08) was found in the incidence of spinal cord ischemia between the two groups: endovascular (4.3%) versus surgical (7.5%).

In a systematic review and meta-analysis of endovascular repair versus open surgical repair for descending thoracic aortic aneurysms, Cheng and colleagues found that endovascular repair may reduce early death, paraplegia, renal insufficiency and other complications. However, similar to the Bavaria trial, sustained benefits on survival were not found.

Unfortunately our patient died after doing well for the first three days. The most plausible cause is an endoleak with aneurysmal rupture. Endoleaks are well known phenomena after EVAR. Four different types of endoleaks have been described based on the site and mechanism of leak.

Major Endoleaks in the immediate post procedure period are invariably fatal. Zarins and colleagues examined the frequency of aneurysm rupture after EVAR. They found that 0.2% of the mortality was due to instrumentation and 0.7% due to aneurysm rupture (7 patients). In all the patients, they found that there was poor fixation of the graft at the proximal or distal sites. 2 of the 7 patients who died had an endoleak with aneurysmal enlargement.

Albeit it is difficult to precisely determine the cause for the rupture in our patient, the most likely reason could have been an unfavourable anatomy with a very weak aortic wall. Another reason could be a sub-optimally positioned stent graft or due to graft migration.

In conclusion, our case highlights some of the important issues when such a patient is encountered in ICU.

References: