# The art of intervention: Describe a case where interventional radiology played a major role in treating the patient and what you learnt?

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## Presentation:

A 72 year-old gentleman, with a background of hypertension, hypercholesterolaemia, 48 smoking pack-years, two myocardial infarctions and end-stage renal failure (eGFR<15mL/min/1.73m$^2$), presented with an hour history of sudden-onset severe central abdominal and back pain associated with vomiting. Examination revealed supra-umbilical tenderness, pulsatile abdominal mass and generalized guarding (Observations: Tachypnoea 24, tachycardia 128, stable systolic blood-pressure 104). The patient had previously been found to have a 5.9cm abdominal aortic aneurysm (AAA) on screening but declined treatment and was under follow-up. Given the history, a decision for emergency computed-tomography (CT) was made after appropriate resuscitation.

## Investigations:

CT showed contrast leakage into a retroperitoneal haematoma, with high-attenuating crescent sign and draped-aorta sign, confirming a contained retroperitoneal rupture. Discussions between acute anaesthetist, on-call vascular registrar and interventional radiologist (IR) confirmed that high anaesthetic mortality denied open repair (OR). An IR confirmed the possibility of endovascular aneurysm repair (EVAR) due to amenable neck diameter, length and angulation.

## Treatment:

This gentleman was successfully treated with a Medtronic Endurant-II Stent graft system™[i]. Access was gained via the right femoral artery, followed by deployment of the stent graft, and access via the left femoral to deploy the contralateral limb. The patient was discharged three days later, with a 24-hour critical-care stay, and no complications seen at the one-month follow up scan.

## Discussion:

Historically and in present day, ruptured AAAs (r-AAAs) hold a large pre-hospital mortality. Intraperitoneal ruptures hold a worse prognosis whilst retroperitoneal ruptures are typically "contained", allowing time to transfer to treatment. Prior to Dotter's 1964 canalization and Parodi's 1990 AAA repair, open repair remained the only option for r-AAA[ii]. The high perioperative morbidity and mortality often meant AAA was managed by palliation due to the anaesthetic risk owed to the, often-seen, multiple co-morbidities of this cohort[iii].

Interventional Radiology has drastically changed the management of ruptured AAA (r-AAA). Results from The Vascular Quality Initiative Database and several trials-AJAX[iv], ECAR[v], IMPROVE[vi], comparing a CT and EVAR strategy versus OR in r-AAA management, have provided an alternative treatment option for thousands of patients. Although several trials' data show little difference in primary and secondary endpoints, careful scrutiny of design and results show that EVAR provides favorable treatment to several cohort sub-types. Patients unamenable to OR due to co-morbidities have had successful EVAR[vii]. EVAR, without its need for aortic clamps, have reduced rates of renal injury[viii]. Custom devices and fenestrated stents have respectively treated short-necked aneurysms and complex aneurysms[ix]. In

summary, IR has provided an alternate treatment for some, and remains the only treatment, for others.

## Reflection:

Despite its success, The IR evidence base, as a new  growing specialty, needs development. A significant proportion of r-AAAs have unfavourable anatomy. Several industry-funded trials remain in early stages, with long-term results awaited. Stent-grafts are not without complications: reducing endoleaks, limb occlusions and secondary complications are all areas of development. However, the birth of this new specialty, with less-invasive access routes and novel devices, has provided patients a new lease on life.

Word count: 499 words

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