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# Expanding Indications of Endovascular Aortic Aneurysm Repair

Zia Ur Rehman

Abdominal aortic aneurysm (AAA) can be a potentially fatal condition, but it is mostly asymptomatic. The main fear is its rupture and the associated morbidity. Patients treated with ruptured AAA have higher mortality. Most of the patients with ruptured AAA are not able to reach hospital. Out of them who have made to hospital, mortality is more than 50%. The rest have prolonged hospital stay and major peri- or post-operative morbidity. The situation may be graver in our set-up. We lack data of true incidence of abdominal aortic aneurysm in our population as there is no screening programme and there is little elective work available. Occasional symptomatic patient, who presents to hospital, has already leaked or the aneurysm is at the verge of rupture. There are very few centres across the country equipped to deal this condition. Usually patient is lost in between transferring from one hospital to the other.

Morbidity and mortality is minimal while repairing these cases electively. Getting it detected by dedicated screening programme and treating when indicated, can save a number of precious lives. There are currently two methods to repair it. One is classic open and other is endovascular, which is minimal invasive. Open repair is effective and durable method of treating AAA. But it can be associated with significant morbidity and peri-operative mortality. It cannot be offered to patients with multiple morbidities. Endovascular abdominal aortic aneurysm (EVAR) is an alternative method of treating this entity. Aneurysm is excluded by placing a stent-graft across it. Randomised controlled trials have shown the superiority of EVAR over open repair, especially in immediate post-procedure years, in terms of shorter hospital stay and lesser perioperative mortality and morbidity.<sup>1</sup> That is explainable as there is no need of aortic exposure, dissection and clamping in EVAR as is the case in open surgery. Patient is prevented from physiological changes incurred during aortic cross-clamping and declamping. EVAR is now used for the majority of AAAs for its minimal invasiveness. Results have improved over the years.

Standard EVAR is offered to patients who are having healthy aortic neck, which is straight and have minimal

angulation. Also good size, disease-free iliac arteries are preferred. More than 50% patients do not have that 'suitable' anatomy and are not the candidate for this modality. This may be in the form of short or angulated neck or the aneurysm is extending proximally involving renal and visceral arteries. There is always the risk of compromising the blood supply of renal and visceral arteries using standard EVAR. Patients with concomitant iliac aneurysms are also not considered candidates for traditional EVAR. There is always a risk of pelvic ischemia while deploying stent-graft around iliac bifurcation in these patients. The other issue is access-related complication as EVAR is deployed through femoral arteries after groin dissection. One of the unique complications of this procedure is endoleak. It is the persistent increase in aneurysmal sac despite placement of stent-graft. It can be due to poor anchorage of stent-graft at proximal, distal ends or junctional points. It is more common in patients with unfavourable anatomy. Endoleak can occur due to a side branch, which is not occluded or due to the porosity of graft.

Newer-generation stent-grafts have been developed which focus much of these issues. Newer-generation devices offer active fixation, and decrease risk of graft migration. There can be either suprarenal or infrarenal fixation which reduces risk of graft migration and endoleaks. Stent-graft materials have been improved over the years that do deal fracture and porosity issues. They have extended coverage with branch preservation.

Access-related complications have been reduced by percutaneous EVAR (PEVAR). This avoids groin dissection. Low profile delivery system are also available.

Patients with unfavourable aortic anatomy like having shorter or angulated neck, iliac stenosis and iliac aneurysms previously, are not thought to be ideal candidates for standard EVAR, thus routinely dealt with endo-vascular means. These aneurysms are classically treated with open repair. With growing experience and development of technology, these aneurysms are routinely repaired with endovascular means. It is either done with fenestrated EVAR (FEVAR) or Chimney technique EVAR (Ch-EVAR). Basic idea is to extend the stent-graft cranially up to the healthy aorta, while preserving blood supply to kidneys and viscera. This is done by creating fenestration (holes) in stent-graft at the intended artery origin for revascularisation. FEVAR can be offered to patients having multiple comorbidities as an alternative to surgery with minimal mortality and morbidity.<sup>2</sup>

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As discussed, iliac artery aneurysms usually do present with AAA.<sup>3</sup> They were classically repaired by surgery. Intervention for common iliac artery aneurysms is typically recommended when they are 3 to 4 cm in diameter. Earlier, they were denied of endovascular option due to risk of internal iliac artery coverage by stent-graft while using standard EVAR techniques. Iliac branch devices (IBDs) method is a good alternative developed and used for iliac aneurysms. They preserve flow to internal iliac aneurysm while maintaining seal in the external iliac artery. Long-term results are very satisfactory with these devices.<sup>4</sup>

Due to potential benefits, many centres are offering EVAR even for ruptured AAA. It has shown to be as effective as open repair. There has also been noted to be less blood loss.<sup>5</sup> Recent randomised trials have confirmed that EVAR had similar 30-day and 1-year mortality when compared with open surgical repair, yet incurred less complications, blood transfusions, and intensive care unit stay.<sup>6</sup>

EVAR has become the main treatment for aortic aneurysms. With advancing technology and experience, almost all the anatomical constraints have been explored. Incidence of endoleaks have been reduced. Even pararenal, juxta-renal and iliac artery aneurysms are being treated in the same setting. Patients with ruptured AAA are also being treated by EVAR. There are

a few centres which have done EVAR in Pakistan and technology has just landed here. This technology has huge potential to treat this public health problem.

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