

Metamorphosis of vascular surgery and Hybrid operations rooms

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The ongoing development of the endovascular surgery has dramatically changed the dimensions of vascular surgery. About 70% of standard vascular procedures are now performed by the means of endovascular technology. Vascular surgeons and patients have enthusiastically embraced the endovascular therapy because of its improved overall morbidities and mortality compared to its open surgical counterpart, particularly for patients with significant medical comorbidities. It is fair to offer these procedures to these patients as these are minimal invasive, easily tolerable, have minimal access related complications, have lesser hospital stay, and are associated with minimal blood loss as compared to open surgical procedures. These procedures are considered as 'standard of care' and achieve better patient satisfaction. Another advantage is that most of the procedures can be performed under local anaesthesia. Over the last two decades, endovascular technologies and devices have undergone rapid innovation, evolution, and refinement. By itself or combined with an open technique, percutaneous interventions have become an integral part of vascular surgery therapeutic regimens, particularly in the fields of aneurysm repair, as well as carotid and peripheral arterial disease. They had and are replacing the time-tested open surgical procedures.

For aorto iliac occlusive disease, surgery has been replaced to endovascular options by the availability of better guide wires, imaging and stents. For iliac lesions, success rates are excellent with balloon angioplasty and stenting, which is now the initial treatment of choice for these lesions.¹ Surgical difficult to approach arteries are best dealt by percutaneous means. Examples are the open procedures for carotid-subclavian bypass and transposition of carotid to subclavian artery for revascularization for the upper extremity ischaemia and subclavian steal syndrome. They are routinely now being performed by endovascular technology² and rarely by open surgery. The other is simple balloon angioplasty for renal artery

stenosis which has made aortorenal vein bypass a procedure of the past as experienced interventionalists who have achieved high levels of technical success.³ Carotid stenting with embolic devices has challenged carotid endarterectomy as the only option available for patients with symptomatic and asymptomatic carotid artery stenosis.⁴ Percutaneous lower extremity intervention, one of the most diverse areas of the endovascular field, has experienced rapid growth over the last decade. The treatment spectrum ranges from transluminal and subintimal angioplasty, through atherectomy and brachytherapy, to endoluminal stent and stent-graft placement. Increased popularity of endovascular approaches for lower extremity diseases has prompted a new classification of lower extremity atherosclerotic lesions based on the anatomic and morphological characters. According to Trans Atlantic Inter-Society Consensus, type A lesions are short and nonocclusive, which can be treated primarily with percutaneous techniques, while type D lesions are long segments of stenosis or occlusions that should be treated surgically. Lesions of intermediate length in the superficial artery have been successfully treated with endovascular grafting,⁵ with respectable 2-year patency results. However, with further advancement in technology and the refinement of devices, more lesions will be amenable to endovascular interventions and better long-term outcomes will be achieved.

The rapid expansion of endovascular technology is going to positively effect and improve the quality of open surgical procedures also. Just for understanding, take the example of catheter embolectomy which is a common vascular surgery procedure for ischaemic limb patients. This is conventionally done blindly and is impossible to be done with comfort in diseased atherosclerotic arteries, and will improve if it is done under fluoroscopic guidance. This can be performed even in the diseased atherosclerotic vessels under vision and with safety.⁶ The other example of improving the quality of existing procedures is getting localization and control of inflow and outflow vessels in a scarred or infected field. Obviously it is a nightmare if done by standard open procedure. The hybrid procedures, combining open and endovascular

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treatment are an example of how the modern vascular surgery is developing. Instead of a treatment consisting of angiography with percutaneous endovascular treatment followed by open surgery in another session, these procedures are combined offering patients a "one stop shop treatment". From the patients' point of view this hybrid treatment is superior.

The rapid demand by the patient for the endovascular will not surprisingly lead to new demands on our working environment also. Conventional ORs and angiography suites are not optimally suited for the procedures. One disadvantage of conventional angiography suite is that they are not built for emergency surgical procedures. Lack of adequate lightening, suction, surgical and anaesthetic equipment and room for surgical instruments and extra personnel can make even the small procedure very challenging. It is obvious that the sterility in OR is superior to in angiography suite. With rapid expansion in the endovascular world, increasing number of challenging procedures have to be scheduled by the endovascular means. Conversion to open procedure is going to increase. Hybrid procedures are going to increase. Standard surgical procedures are going to be modified to improve quality and require better imaging. So the future of endovascular procedures lies in the hybrid ORs where both the endovascular and open treatment options can be provided without any resistance.

Pakistan is far behind in the provision of endovascular services to patients. Not to mention the developed countries, even our neighboring countries as Iran, India

and Turkey have well established centers with Hybrid operations rooms (OR). One of the main reasons is lack of vision and underestimation of this modality of treatment. If we have to catch up with the rest of world and provide the standard of care to vascular surgery patients, we have to step up from this static situation and establish centers where endovascular treatment options are to be provided to the patients.

The extra cost spent in creation of Hybrid ORs will convert in the optimal circumstances and will result in improved workflow. The realization of an endovascular suite is essential for vascular centers.

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