GENERAL SURGERY

Elective report at Massachusetts General Hospital, Boston, USA.

As part of my medical elective I undertook a vascular surgical internship at the Massachusetts General Hospital, (MGH) Boston, USA. The majority of cases I observed comprised of patients presenting with peripheral arterial disease (PAD), carotid artery disease, abdominal aneurysms and venous disease including varicose veins and venous ulcers. As a consequence I was exposed to a wide array of vascular surgical interventions having scrubbed in on the following cases:

- Thoracic and infra-renal abdominal aneurysm repairs with the use of synthetic Dacron grafts via open surgical approaches.
- Carotid endarterectomies with electroencephalogram monitoring.
- Lower extremity angiography -/+ angioplasty or stenting.
- Surgical or endovenous ablation for the treatment of varicose veins comprising of saphenous vein stripping -/+ stab phlebectomy or laser and radiofrequency ablation respectively.

What are the prevalent vascular conditions in USA? How do they differ from the U.K?

The majority of cases I observed at my time at the MGH were lower extremity angiograms -/+ angioplasty or stenting due to peripheral artery disease, PAD. PAD is an evolving health burden within the United States representing one of the leading causes of mortality and morbidity.[i] It is considered as part of a global vascular problem attributed to diffuse atherosclerosis, a chronic progressive systemic disease of multifactorial aetiology. Approximately 27million people are affected by PAD in the western world. Within the United States 0.025% of the population are affected by PAD with a peak incidence of 60 cases per 10,000 per persons per annum. [ii] Furthermore the prevalence of disease increases with advancing age affecting 2% of those under 60 years of age rising to over 18% of Americans over 70 years of age. Epidemiological studies have also implicated a disproportionately higher prevalence amongst African -Americans compared to Hispanics and non-Hispanic whites.[iii] Studies on PAD in the U.K reveal slightly lower prevalence with 0.015% of the population affected by PAD. Similarly the incidence of PAD increases with advancing age with 2.5% of the population affected under 60 years of age compared to 19% of those over 70 years of age.[iv] Importantly in the western world 70-80% of individuals are asymptomatic, with only a minority of patients requiring revascularisation procedures or in severe cases amputations, however as PAD is viewed as a measure of an individual's global systemic atherosclerotic burden even asymptomatic forms of disease is of great significance in dictating clinical intervention.[v]

How are healthcare services delivered? How does it differ from the U.K?

Healthcare in the United States is provided by the dual contribution of private and public insurers; however the system is chiefly dominated by private insurers. Public health insurance includes programmes such as Medicare, Medicaid, the State Children's Health Insurance Programme (S-CHIP) and the Veteran's administration (VA). Medicare, a federal programme covering individuals over 65 years of age is financed by federal income taxes, a payroll tax

shared by employers and employees and individual enrollee premiums. Unfortunately Medicare provides incomplete coverage offering no dental, hearing or vision care, thus supplemental insurance is often necessitated. Medicaid is designed for low income households and those with disabilities, however many poor individuals earn too much to qualify for Medicaid and thus remain uninsured. It is jointly financed by the states and federal government through taxes, with the federal government contributing 57% towards costs. S-CHIP was founded in 1997 to cover children whose families earn too much to qualify for Medicaid but too little to purchase private health insurance. The VA is a federally administered programme for veterans of the military offering affordable and often free healthcare to veterans in government-owned VA hospitals and clinics. Private health insurance can either be employer-sponsored insurance, the main form in which Americans receive health insurance or individual market for those that are self-employed or retired. Notably the type of coverage, degree of co-pays and deductibles varies considerably with a specific health insurance plan.[vi]

The British healthcare system is in stark contrast to the American system, providing a publicly funded healthcare system, known as the National Health Service (NHS). Founded in 1946 the NHS is based on an ideal that good healthcare should be available to all regardless of wealth. It is primarily funded through general taxation, governed by the Department of health and headed by the Secretary of State for Health. It is divided into primary, secondary and tertiary care, providing care in areas of general practice, emergency care, long term care and dentistry. Through general taxation the NHS provides all residents of the United Kingdom with medical services free at the point of use, allowing citizens to access the full breadth of critical and non-critical medical care without any out-of-pocket payment. Despite this some specific NHS services such as dental care, prescriptions and aspects of long term care require financial contribution but are less expensive than equivalent services provided by private healthcare providers.[vii]

What are the risk factors attributing to peripheral vascular disease?

Recognised risk factors attributed to the development of PAD are similar amongst the two population demographics with smoking and diabetes being the strongest predictors for PAD risk. Smokers have a twofold increase risk of mortality, disease progression and limb amputation rates compared with non-smokers. Moreover current smokers are known to have a higher rate of procedural complications particularly following percutaneous interventions. Consequently smoking is largely considered the single most important, preventable risk factor for PAD.[viii] A longitudinal study, the US Framingham Study carried out by the National Heart Institute in Massachusetts in 1949 first demonstrated the strong association between cigarette smoking and PAD. Following 5127 men and women for 16 years, data accumulated concluded a significantly higher incidence of intermittent claudication was prevalent amongst smokers compared to non smokers. The exact mechanism by which smoking induces atherosclerosis remains to be elucidated. However smoking appears to damage endothelial cells lining blood vessels resulting in increased permeability to lipids. Moreover smoking stimulates the formation of atheromas reducing blood flow leading to ischaemia and increases coagulation encouraging thrombosis.[ix] Diabetes mellitus is also

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known to cause endothelial and smooth muscle cell dysfunction with the risk of developing lower extremity PAD proportional to the severity and duration of diabetes. Although diabetics often have extensive involvement of diffuse PAD, advanced PAD seems to be related to the duration of diabetes rather than glycaemic control. As previously mentioned age is also a significant risk factor with a 1.5 to two-fold increase for every 10 year increase in age.[x] Other risk factors include dyslipidaemia, hypertension, obesity, sedentary lifestyle with a lack of physical exercise and a positive family history. PAD patients die mostly of cardiac and cerebrovascular related events and much less frequently due to obstructive disease. Consequently aggressive risk factor modification is required to reduce cardiac mortality in PAD patients by promoting smoking cessation, strict diabetic control, reduction of blood pressure, aggressive low-density lipoprotein lowering, losing weight and the use of oral anti-platelet drugs.[iii]

Describe a case you observed during your elective.

A memorable case of a patient diagnosed with PAD was a 64 year old female who underwent an elective angiogram procedure with bilateral common iliac stent insertion. She had an extensive PAD history with previous bilateral femoral-popliteal venous bypass grafts, prior angiograms and stent insertion with concurrent coronary artery disease. During the procedure the attending opted directly for stent insertion without attempting angioplasty as the aortic bifurcation was severely calcified. I was involved in simultaneously deploying the stent into the right common iliac artery whilst the fellow deployed the left-sided stent. The procedure was proving increasingly difficult as the patient, a current smoker was suffering from bronchospasm having smoked her last cigarette just hours prior to the procedure. Consequently the anaesthetist opted for her to undergo general anaesthesia from a local at the site of the femoral artery. Although the surgery itself was successful her recovery post operatively was complicated by a chronic cough which had to be controlled by nebulisers and lead to continuous bleeding of a superficial vein on the right femoral artery site due to increase abdominal pressure. The anaesthetist stated he would not consider her medically fit for further surgeries due to the difficulties he had entailed upon this procedure and advised the patient on the pertinence of smoking cessation. Throughout my time at MGH I had seen the consequences of smoking having observed abdominal aortic bi-femoral bypass grafts and numerous angiograms however witnessing a patient with extensive arterial disease undergoing her seventh vascular surgical intervention and yet continuing to smoke imparted important ethical issues and discussion points for me. Namely at what point does a patient take ownership for their actions which directly accelerates their disease process. Moreover should healthcare professionals use such informati0on to help direct rationing of finite medical resources?

References:

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