

The ADAPT Centre at Beaumont Hospital

a new approach to arterial disease
assessment, prevention and treatment

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The arterial tree is one of the most intriguing and, undoubtedly, the most ubiquitous, of the body's organs. Actually, it is not commonly thought of as an organ at all, but considered in isolation according to the specialty best suited to managing the presenting symptoms, such as cardiology, nephrology or neurology. The reality, however, is that an insult to any part of the circulatory system is a threat to the arterial organ as a whole, and management of disease in one part should be common to management of that in another, although the local symptoms may require interventional skills peculiar to the affected area.

For example, the cardiac surgeon tends to direct his skills to coronary artery bypass surgery, whereas the vascular surgeon develops skills in reparative procedures for the aorta and major blood vessels. With the development of radiological skills in angioplastic and stenting techniques, these barriers are starting to break down. However, the management of the underlying central disease process (generally atherosclerosis in one form or another) is commonly haphazard and dependent on which of the cardiovascular routes the patient has taken.

Superlative interventional procedures are often successfully performed without attention being given to the continuing need for risk factor management and therapy to protect the arterial organ as a whole and maintain reparative processes. Each specialty works on a particular organ, and generally ignores the likelihood that other organs may be threatened by occlusive disease of the arterial system elsewhere. Logical practice should, however, demand comprehensive assessment of the entire circulatory system. We established the arterial disease assessment, prevention and treatment (ADAPT) clinic to try to achieve these goals.

The ADAPT concept

A man aged 55 years was referred to our unit because his family physician had recorded a blood pressure of

160/95mmHg during a check-up. The patient, who had not been seen by a doctor for five years, developed calf pain while playing golf and was referred by his family physician to a vascular surgeon with a diagnosis of intermittent claudication.

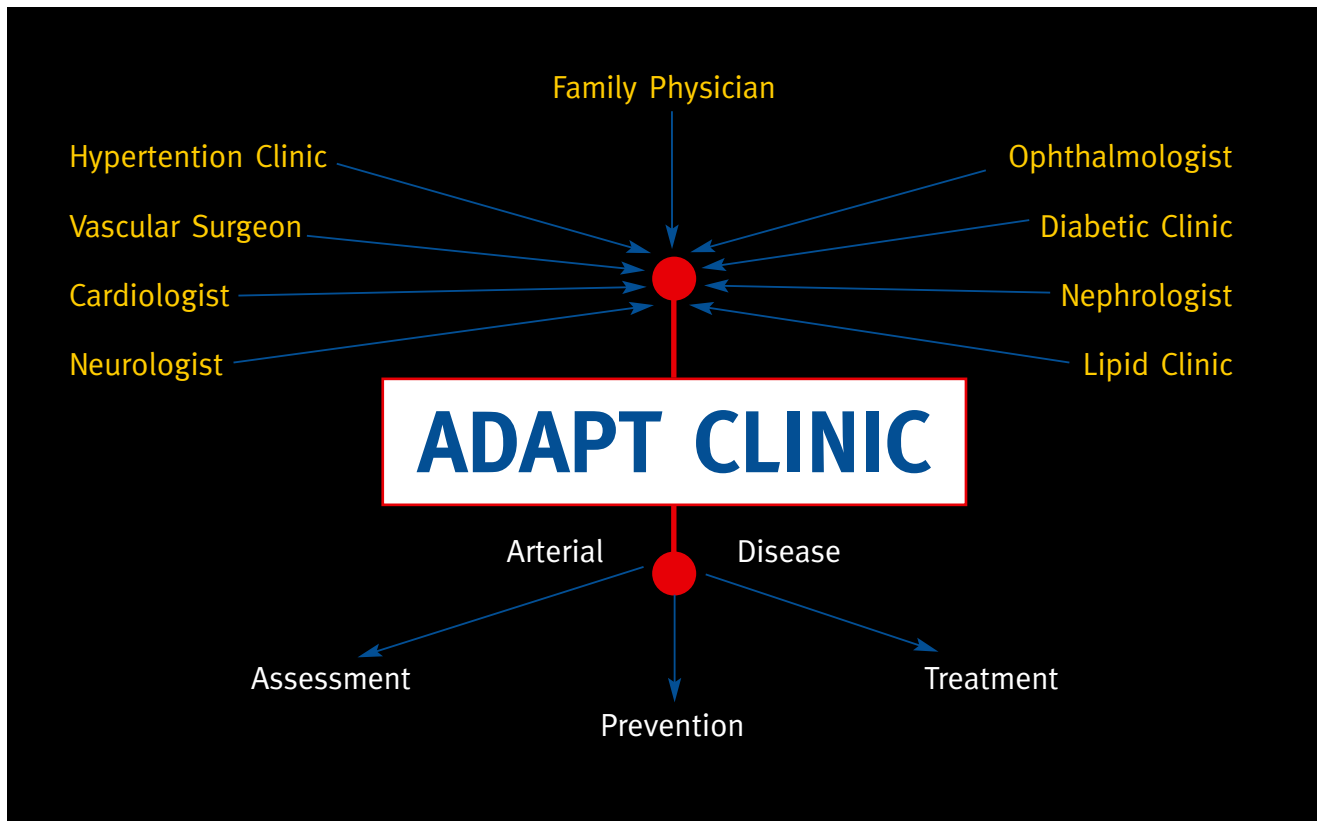
A femeropopliteal bypass cured his symptoms and, after one postoperative visit, he was discharged back to the care of his family physician. He had not attended for follow-up until his wife urged him to have the check-up, which resulted in the present referral.

The patient denied any cardiovascular symptoms. He managed a small business and played 18 holes of golf at least twice a week. He had not smoked since his operation, his intake of alcohol and salt was moderate, and he was about 2kg overweight. Apart from a raised blood pressure of 154/92mmHg and absent pedal pulses bilaterally without notable tropic changes, clinical examination was unremarkable.

Positive investigations were: fasting cholesterol 8.4mmol/L; triglycerides 1.6mmol/L; HDL fraction 1.50mmol/L; LDL fraction 6.90mmol/L; blood pressure in the clinic 168/102mmHg; ambulatory daytime blood pressure 152/91mmHg; and night-time blood pressure 132/84mmHg. Renal function, electrocardiography and echocardiography were normal.

This case is not unusual and many doctors who run cardiovascular clinics will be familiar with many such patients. However, on further investigation, this patient's hospital notes from the time of femeropopliteal bypass five years previously showed some notable findings. Blood pressure was recorded as at or just above 150/90mmHg on three occasions, although normal on others. He had also a fasting serum cholesterol of 6.9mmol/L. Although the patient was generally well and symptom-free five years after his bypass, the state of his graft might have been healthier if the risk factors of mild hypertension and hypercholesterolaemia had been aggressively managed from the outset.

Figure 1



However, borderline hypertension and hypercholesterolaemia did not then attract the same attention they do now. Therefore, after much thought about this patient's disorder and the state of his arterial system, the concept of the ADAPT clinic developed.

The facility was seen as one that would enable assessment, management and treatment of all cardiovascular patients, whatever their presentation, according to a common protocol. The ADAPT clinic was proposed, therefore, as a clinical response to the increasing burden of arterial disease in a variety of specialties. These included: transient cerebral ischaemia and stroke in neurology; coronary heart disease, hypertension and dyslipidaemia in cardiology; renal artery stenosis in nephrology; aortic aneurysm, and peripheral vascular and carotid arterial disease in vascular surgery; ischaemic colitis in gastroenterology; hypertensive and diabetic retinopathy in ophthalmology; and diabetic vascular disease in endocrinology (Figure 1).

The ADAPT clinic

The establishment of the ADAPT clinic was facilitated by the shared care approach to outpatient management that had been used for the previous five years in the blood pressure and lipid clinics at Beaumont Hospital, Dublin. The principle of this approach is that referred patients are assessed initially by a nurse who inputs patients' details onto a database, arranges investigations and presents the consultant with all relevant data. This enables diagnostic and management decisions to be made at the first consultation.

Patients referred to the ADAPT clinic are first inter-









viewed by a nurse who enters the patient's name, address, age, sex, personal and family history, height, weight, body mass index and current blood pressure into the database (DABL-CV, ECF Medical, Dublin) designed specifically for the management of cardiovascular patients. The nurse then arranges various investigations, such as urinalysis, biochemistry, fasting lipids, ECG, echocardiography and 24 hour ambulatory blood pressure measurement that have pre-booked times. Results are entered onto the database before the patient sees the doctor.

The database incorporates a feature that permits classification of patients as high risk, medium risk, or low risk according to risk factors, such as smoking, body mass index, blood pressure, lipids and the presence or absence of target organ damage or arterial disease.

Initially high risk patients are selected for aggressive collaborative management. There are two goals in the treatment of high risk patients: coordinated and stringent modification of identifiable risk factors, and prescription of drugs (e.g. statins and antiplatelet therapy) that may benefit the arterial organs or improve haemostasis.

For risk modification, the familiar risk factors, such as smoking, obesity, excessive alcohol, dyslipidaemia, hypertension and glucose intolerance, are addressed. To deal with these risk factors successfully in patients at high risk from cardiovascular disease, the goals of management should be set well within the limits of normal for age and sex. Other potential risk factors, such as homocystine, fibrinogen and lipoprotein-a, which, as yet, are not generally accepted as deserving therapeutic intervention treatment should, if identified, be corrected in these high risk patients.

Figure 2
Risk factor indicators for blood pressure and risk factor profiles

	Patient A		Patient B	
	Visit 1	Visit 2	Visit 1	Visit 2
Referral data Sex Family history Height cm Referral BP	Male Both parents 167 210/105		Male Both parents 170 180/115	
Blood pressure mmHg Mean office BP <i>ABPM</i> Mean daytime Mean night-time Blood pressure indicator	197/124 174/110 151/99 	160/102 133/85 102/65 	200/114 174/109 155/94 	165/104 134/87 113/70 
Risk factors Age Smoking Alcohol Salt cellar Exercise Weight kg Body Mass Index kgm-2 Total cholesterol mmoll-1 Risk factor indicator	45 20 cigarettes/day 40 units/week Yes Sedentary 85.1 31 7.30 	46 none 15 units/week No Exercise walks 77.4 28 5.10 	45 40 cigarettes/day 42 units/week Yes Sedentary 83.8 29 5.9 	46 20 cigarettes/day 40 units/week Yes Sedentary 88.6 30 6.72 

This table shows two male patients of similar age and build with a family history of hypertension in each. Quite severe hypertension is being well controlled with antihypertensive medication.

However, the benefit of risk factor control is evident in patient A but not in patient B, who, in spite of good blood pressure control, remains at high risk for a cardiovascular event.

For medication, drugs such as the statins should be used for their lipid-lowering properties and their potentially beneficial effects on the arterial vessel wall. Similarly, antithrombotic agents (e.g. aspirin and warfarin) should be used as indicated to influence the haemostatic balance towards fibrinolysis rather than thrombosis.

Patients with high risk cardiovascular disease and manifestations of arterial organ involvement are currently being referred to the ADAPT clinic. The cardiovascular assessment is necessarily detailed and time-consuming, but the cardiovascular profile generated is sufficiently comprehensive to allow critical appraisal of management and treatment strategies.

An example of the ADAPT approach may be seen in patients A and B (Figure 2). Both patients were similar at initial assessment, with histories of ischaemic heart disease, family histories of cardiovascular disease in both parents, similar risk factors and referral blood pressures (210/105 mmHg and 180/115mmHg). During four months of risk factor modification, antihypertensive treatment successfully decreased blood pressure in both patients. However, overall risk factor modification was successful only in patient A, in whom cholesterol was decreased with pravastatin, whereas cholesterol increased in patient B.

Using the DABL, computed risk factor indicators (Figure 2), patient A's risk factors were eventually decreased from the high risk zone (red) to just within the low risk zone (green); whereas for patient B the risk factor indicator increased within the red zone, which showed the need for more aggressive management.

The ADAPT Centre

The main goal of ADAPT is to create as favourable an environment for the cardiovascular system as possible with current knowledge. The ultimate objective of ADAPT is to provide all patients with arte-

rial disease with a long-term strategy of prevention of further risks and the most scientific approach to treatment of their vascular disease with efficient management and treatment of the entire arterial organ to delay or prevent progression of the disease.

An important secondary objective is to use existing and developing technology, such as tonometry and ultrasound, to assess the entire arterial tree and identify areas that may be threatened by the atherosclerotic process.

Indeed such has been the success of the ADAPT concept that the ADAPT Centre was opened in Beaumont Hospital last year. The centre is fully equipped to perform a non-invasive evaluation of the arterial organ using sophisticated vascular ultrasonic imaging techniques of the carotid and retinal arteries, arterial tonometry and pulse wave velocity, silent ischaemia monitoring and laboratory assessment of platelet and endothelial function. This is in addition to electrocardiography, echocardiography, general biochemistry, lipid profiles and 24 hour ambulatory monitoring of blood pressure.

The foundation of the ADAPT Centre anticipates that cardiovascular research will soon provide therapeutic options that will require facilities permitting a more holistic approach to the management and investigation of cardiovascular disease.

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This article is based on the following: O'Brien E, Bouchier-Hayes D, Fitzgerald D, Atkins N. The arterial organ in cardiovascular disease: ADAPT (arterial disease assessment, prevention and treatment) clinic. *Lancet* 1998; 352: 1700-2