EDITORIAL

The Need for Specialized Vascular Units: The ADAPT Approach

AQ2 **Eoin O'Brien[1]**

The arterial tree is one of the most intriguing and, undoubtedly, the most ubiquitous, of the body's organs. It is not, however, commonly thought of as an organ at all, but is 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, but 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.[1]

Superlative interventional procedures are often successfully performed without attention 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

The concept of the ADAPT Clinic arose from the need to provide a facility that would enable assessment, management, and treatment of all cardiovascular patients, whatever their presentation, according to a common protocol. The ADAPT Clinic was conceived to coordinate the management of arterial disease, irrespective of the specialty through which the patient was referred in the hospital. To gain the acceptance of different specialties, it was imperative that the Clinic not be seen to be interfering with the management of patients. The ADAPT Clinic was proposed, therefore, as a clinical response to the increasing burden of arterial disease in a variety of specialties, such as: transient cerebral ischemia and stroke in neurology; coronary heart disease, hypertension, and dyslipidemia in cardiology; renal-artery stenosis in nephrology; aortic aneurysm and peripheral-vascular and carotid-arterial disease in vascular surgery; ischemic colitis in gastroenterology; hypertensive and diabetic retinopathy in ophthalmology; and diabetic vascular disease in endocrinology (Fig. 1).

The logical role for the ADAPT Clinic was to provide a common strategy for all patients, irrespective of the target organs involved, that would complement the referral source and allow the patient to return to it for specialist treatment. These concepts were readily accepted by the cardiovascular division of the hospital in which the Clinic was based.

THE DABL™ PROGRAM

The establishment of the ADAPT Clinic was dependent on having a computerized management system for the outpatient clinics. The DABL™ Program has been

---
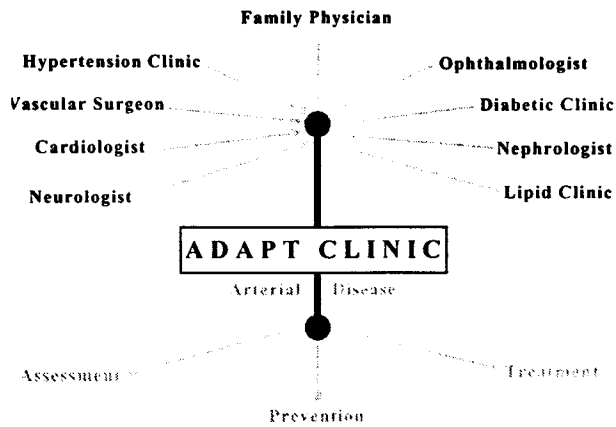
ls
le

Family Physician

Figure 1 The ADAPT concept.

developed over the past decade to assess cardiovascular disease.[2] It is dependent on a structured management system for patients attending the Blood Pressure and Lipid Clinics. At first attendance the patient is assigned a nurse who has been trained to operate the DABL™ Program. She interviews the patient and inputs basic details into a database. These include height, weight, blood pressure, urinalysis, risk factors, family history, and drug history. She then gives the patient appointments for prebooked investigations during the next fortnight. These are dependent on the cardiovascular manifestation that the patient presents with, but to take as an example a patient with hypertension, the investigations would include biochemistry, fasting glucose and lipids, ECG and echocardiography, and 24-hour ambulatory blood pressure measurement. As the results become available, the nurse enters them into the database. When the patient sees the consultant within 2 weeks, all relevant data are available and the DABL™ Program has collated these data and made an initial cardiovascular assessment stratifying the patient into high, medium, or low risk. The consultant takes a history of the presenting complaint and a previous history, but is spared the need to take a family or risk-factor history, as this has already been done by the nurse. The consultant then enters any relevant findings directly into the DABL™ database, and then with the relevant historical, physical, and investigational data at hand, the consultant is able to make both diagnostic and management decisions at the one consultation. Using existing outpatient practices, whereby the patient has to be sent away for investigations, the consultant can only make an incomplete diagnostic decision at the first consultation: a comprehensive diagnostic decision and a management decision have to be delayed until the results of investigations are available at a second consultation.

The entry of the historical data, the results of investigations, and the clinical findings into the database provides the DABL™ program with sufficient information to assess both risk and target organ status, which can then be combined to allow stratification of patients with cardiovascular disease as being at high, medium or low risk for the future development of cardiovascular disease (Fig. 2).

Other features of the DABL™ Program include its ability to analyze and print the results of 24-hour ambulatory blood pressure recordings and the facility to write letters using drop-down menus (Fig. 3). It is planned to extend the investigation reporting facility to AQ3 other investigations, so that with the inclusion of both initial and follow-up letters to the referring source, the database will be entirely comprehensive.

THE ADAPT CLINIC
Patients with high-risk cardiovascular disease and manifestations of arterial-organ involvement who present to the blood pressure, lipid, vascular surgery, elderly, and renal clinics are referred to the ADAPT Clinic if deemed appropriate. To prevent the Clinic from being overwhelmed, patients are categorized as being either high risk with uncontrolled risk factors or high risk with controlled risk factors. Patients in the latter group are directed back to the primary care physician, whereas the patients with uncontrolled risk factors attend the ADAPT Clinic for continuing risk-factor modification and treatment. Cardiovascular assessment of these patients 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 (Fig. 2). The patients were similar at initial assessment, with personal histories of ischemic heart disease, family histories of cardiovascular disease in both parents, and similar risk factors and referral blood pressures (210/105 mm Hg and 180/115 mm Hg). During 4 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, Patient A's risk factors were eventually decreased from the high-risk zone (shown in black) to just within the low-risk zone (white), 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 favorable an environment for the cardiovascular system as possible with current knowledge. The ultimate objective of

ls __
le __
ll __

	Patient A		Patient B	
	Visit 1	Visit 2	Visit 1	Visit 2
Referral Data				
Sex	Male		Male	
Family History	Both Parents		Both Parents	
Height *cm*	167		170	
Referral BP	210 / 105		180 / 115	
Blood Pressure *mmHg*				
Mean Office BP	197 / 124	160 / 102	200 / 114	165 / 104
ABPM				
Mean Daytime	174 / 110	133 / 85	174 / 109	134 / 87
Mean Night-time	151 / 99	102 / 65	155 / 94	113 / 70
Blood Pressure Indicator				
Risk Factors				
Age	45	46	45	46
Smoking	20 Cigarettes/day	None	40 Cigarettes/day	20 Cigarettes/day
Alcohol	40 units/week	15 units/week	42 unit/week	40 unit/week
Salt Cellar	Yes	No	Yes	Yes
Exercise	Sedentary	Exercise Walks	Sedentary	Sedentary
Weight *kg*	85.1	77.4	83.8	88.6
Body Mass Index *kgm^{-2}*	31	28	29	30
Total Cholesterol *mmol^{-1}*	7.30	5.10	5.9	6.72
Risk Factor Indicator				

Figure 2 Risk factor indicators for blood pressure and risk factor profiles for two male patients of similar age and build with family histories of hypertension. In each of them 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.

ADAPT is to provide all patients with arterial 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 to identify areas that may be threatened by the atherosclerotic process. Indeed, such has been the success of the ADAPT Clinic that the ADAPT Centre was opened in Beaumont Hospital in 1999. The Centre is fully equipped to perform a noninvasive evaluation of the arterial organ using sophisticated vascular ultrasonic imaging techniques of the carotid and retinal arteries, arterial tonometry and pulse wave velocity, silent ischemia monitoring, and laboratory assessment of platelet and endothelial function. These are 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 re-
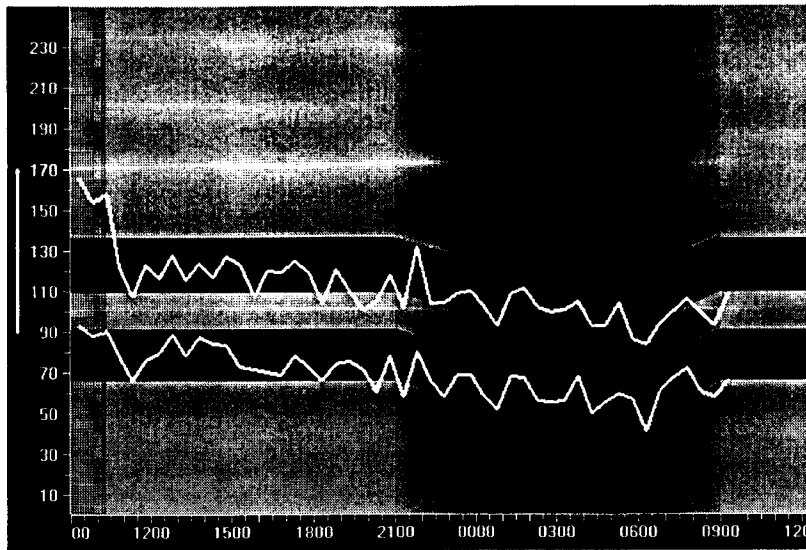
Figure 3 Computer-generated DABL™ Report for ABPM. This 24-hour ABPM indicates white coat hypertension with pressures in the first hour averaging 162/90 mm Hg, but thereafter day and night-time blood pressures are within normal limits.

search will soon provide therapeutic options that will require facilities permitting a more holistic approach to the management and investigation of cardiovascular disease.

NOTE
The DABL™ Program is distributed by ECF Medical Ltd, 34 Main Street, Blackrock, Co. Dublin, Ireland. Information is available at www.medical.ecf.ie.

REFERENCES

1. 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;352:1700–1702
2. Atkins N, O'Brien E. DAB97: a computer program for the assessment of blood pressure, risk factors and cardiovascular target organ involvement in hypertension. J Hypertens 1998; 16(suppl 2):S198

AQ1: Au: Street address needed—Beaumont Hospital.
AQ2: Au: Need degrees!
AQ3: Au: Possible to reword?

ls __
le __
ll __