

Vascular services at Hospital Pulau Pinang

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Abstract

The availability of vascular surgery services is relatively recent in Malaysia. An audit was undertaken to determine the magnitude and trend of the workload in a Tertiary Referral Centre with 1,236 beds. A retrospective review of outpatient attendances, non-invasive vascular investigation, and operative workload was carried out. A prospective running audit waiting list for haemodialysis vascular access construction and maintenance was also conducted. All items of service were found to be on the increase. The mean number of patients seen as new referrals and follow-up patients increased 35.9% (13.1 to 17.8) and 123.3% (26.6 to 59.4) respectively. The prospective running audit of the waiting list for haemodialysis vascular access construction increased from by 51.1% (47 – 71) despite a mean of 5.5 procedures being performed a week. The current vascular surgery services involve limb and life preserving procedures such as haemodialysis vascular access construction and maintenance, long term intravenous access, major arterial reconstruction and intervention for trauma. Service workload is substantial and staffing inadequate. An increase in staffing and an independent operational budget is required to cope with service requirements.

Key words: vascular services, vascular surgery, northern Peninsular Malaysia

Introduction

The availability of vascular services is relatively recent in Malaysia with the bulk of the workload being borne by the Vascular Unit in Hospital Kuala Lumpur. A review was undertaken to determine the magnitude and trend in the requirements of vascular services at Hospital Pulau Pinang which when fully developed can provide for the vascular service requirements for northern Peninsular Malaysia.

Materials and Methods

A retrospective review of outpatient attendances, duplex scan examinations, and operative procedures was carried out to determine the trend in the service load. A weekly running surveillance audit of the waiting list for haemodialysis vascular access construction over 55 weeks was prospectively undertaken.

Results

Outpatient Attendances

During the last eight months of 2001 the number and monthly mean of follow-up outpatients was 213 and 26.6 respectively, while for new outpatients these were 105 and 13.1 respectively (Fig. 1). The total number of outpatients and monthly mean were 318 and 39.8 respectively. For the 12 months of 2002, the total number and monthly mean of follow-up outpatients were 713

and 59.4 respectively, while for new outpatients these were 214 and 17.8 respectively, resulting in a total and monthly mean number of 927 and 77.3 outpatient visits respectively. The mean monthly outpatient visits increased for all patients (39.8 to 77.3), new referrals (13.1 to 17.8) and follow up patients (26.6 to 59.4), the increases being 94.2%, 35.9% and 123.3% respectively.

Duplex Scan Examinations

In the years 2001 (last 7 months) and 2002 (12 months), 53 and 137 duplex scan examinations were performed respectively with an increase in the mean number of duplex examinations performed monthly from 7.6 to 11.4, an increase of 50% (Fig. 2).

Operative Procedures

Over a 22 month period (May 2001 – February 2002), 898 operative procedures were performed (Table 1). Of these, 575 (64.0%) were for acquiring and maintenance of vascular access for haemodialysis, 115 (12.8%) were related to the treatment of vascular trauma and its consequences and 74 (8.2%) for the treatment of atherosclerosis and its complications. Eighty one (9.0%) procedures were related to vascular access for infants and children with depleted venous access and adults who required long term

vascular access for treatment of haematological and solid organ malignancies. Varicose veins and amputations accounted for 30 (3.4%) and 23 (2.6%) respectively. The proportions of Malays, Chinese, Indians and others who required these operative procedures were 40.9% (367), 40.2% (361), 14.8% (133) and 4.1% (37) respectively.

A weekly running surveillance audit was undertaken on the waiting list for haemodialysis arteriovenous fistula access construction. Over a 55-week period, the waiting list was audited weekly. During this period, 303 new patients were added to the list which comprised of 47 patients in week 1 (week ending 10 November 2001). Over the subsequent 55 weeks, 279 patients were removed from the waiting list as they had their arteriovenous fistula constructed or had died. Of these 279, 234 (83.9%) and 23 (9.8%) had the arteriovenous fistula construction procedures at Hospital Pulau Pinang and private hospitals respectively, and 22 (9.4%) died while waiting for vascular access construction (Fig 3). Over the 55 weeks, the waiting list increased by 51.1% (47 to 71) despite a mean of 5.5 haemodialysis vascular access construction

procedures being performed weekly at Hospital Pulau Pinang.

A large proportion of vascular access construction procedures were performed on patients who have previous multiple fistulas and exhausted potential fistula sites. Of the 348 arteriovenous fistula construction procedures, 105 (30.2%) constituted primary distal forearm procedures, 106 (30.4%) primary procedures involving the median cubital vein and 131 (37.6%) revision procedures, comprising 21 (6.0%) midforearm revisions, 60 (17.2%) median cubital vein revisions, 17 (4.8%) elevated basilic vein revisions and 33 (9.5%) miscellaneous complex revisions and reconstructions.

Discussion

Vascular services for northern Peninsular Malaysia are still in their infancy. Services have been provided at Hospital Pulau Pinang sporadically since 1996 by an expatriate surgeon, supplemented by another surgeon from 1997 to 1999 and by a contracted private specialist from 2000 to 2001. Services by the incumbent visiting surgeon commenced in May 2001.

Table 1. Operative procedures carried out from May 2001 to February 2002

Procedures	Ethnic Groups				
	Malay	Chinese	Indian	Others	All
Vascular access explorations	3	2	1	0	6
Permcaths procedures	58	77	31	0	166
Primary distal third arteriovenous fistula	47	44	14	0	105
Primary MCV arteriovenous fistulas	52	40	14	0	106
Revision mid-forearm arteriovenous fistula	10	5	6	0	21
Revision MCV arteriovenous fistula	22	34	4	0	60
Miscellaneous revision arteriovenous fistula	11	16	6	0	33
Elevated BBF arteriovenous fistula	5	9	3	0	17
Vascular access related wound procedures	13	36	12	0	61
Trauma related explorations	14	4	3	2	23
Trauma related wound procedures	50	0	9	33	92
Major Arterial reconstructions	36	31	6	1	74
Treatment of venous insufficiency	5	18	6	1	30
Amputations (major, minor) & debridements	7	12	4	0	23
Tunnelled venous catheters for vascular access	34	33	14	0	81
Total	367 (40.9%)	361 (40.2%)	133 (14.8%)	37 (4.1%)	898 (100%)

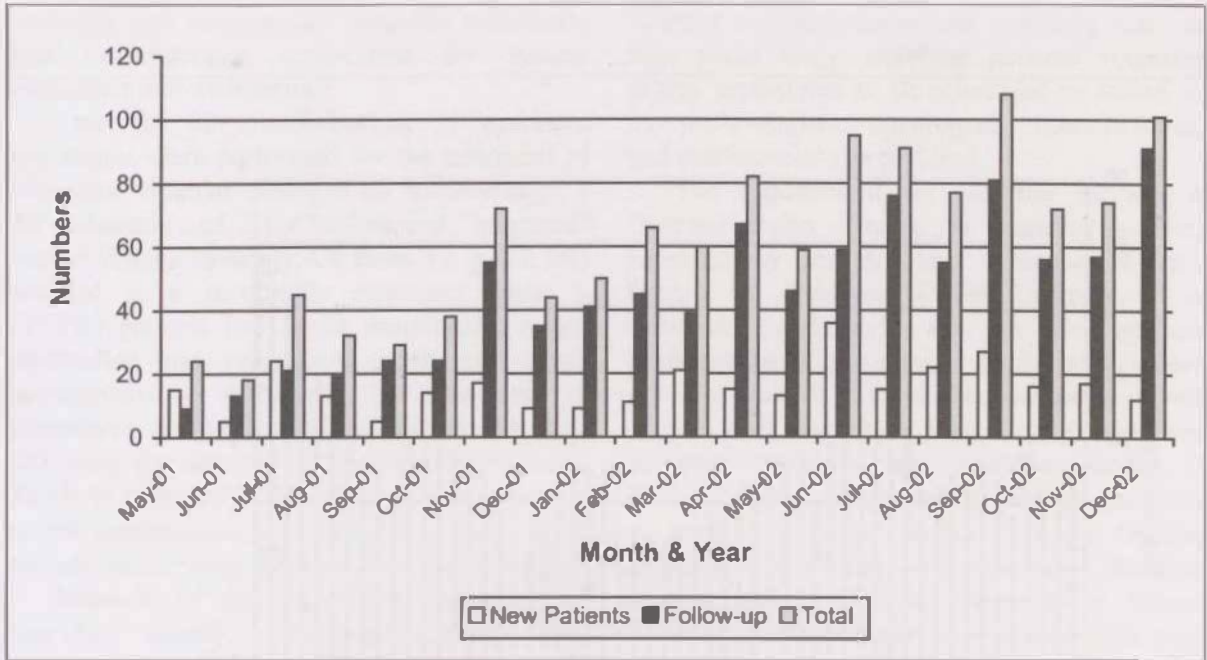


Fig. 1. Vascular outpatient clinic attendances

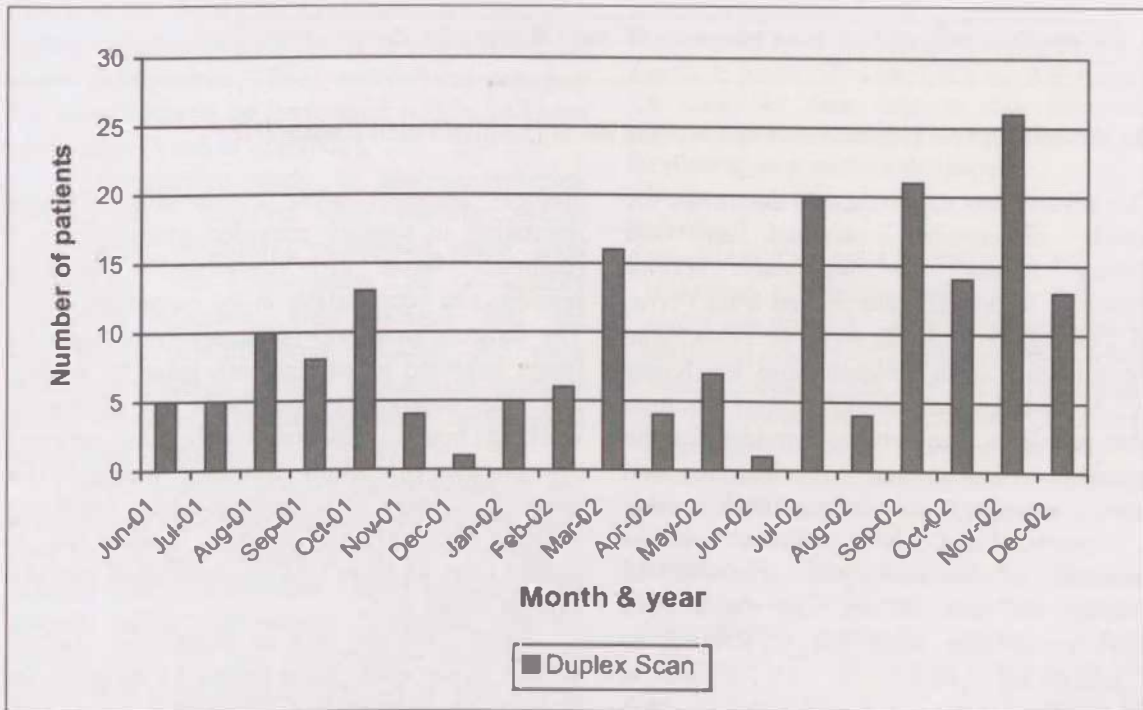


Fig. 2. Duplex scan examinations

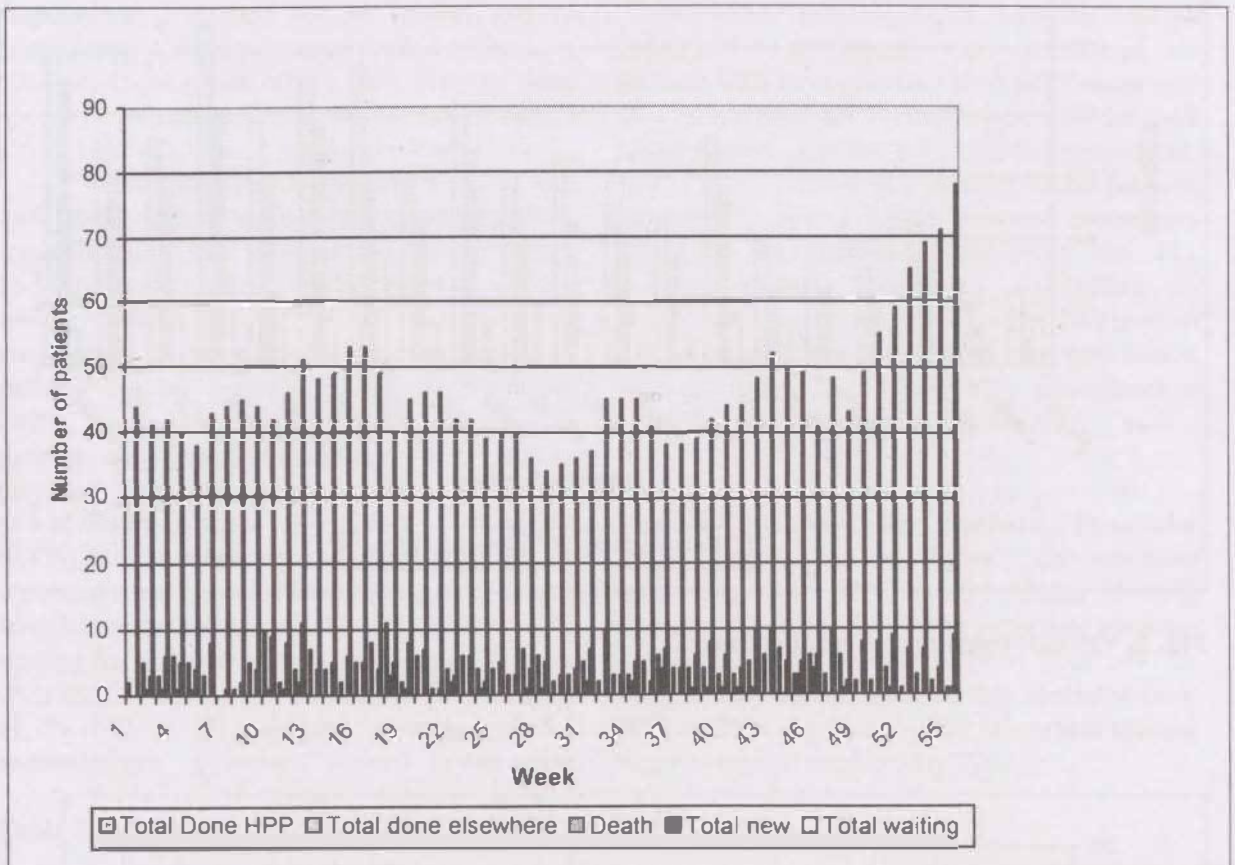


Fig. 3. Vascular access requirements and waiting list at Hospital Pulau Pinang (HPP)

This review was undertaken to determine the magnitude of services required and the developing trend in vascular service requirements. Referrals were fielded from Perlis, Kedah, Penang, Perak as far south as Teluk Intan and occasionally from Kelantan and the Klang Valley. Apart from the management of common vascular problems, the service provides for the management of trauma, (accidental and iatrogenic), vascular access for paediatrics and is being overwhelmed by vascular access requirements of haemodialysis arteriovenous construction for renal failure. The majority of operative procedures were life prolonging or limb preserving procedures. All peripheral arterial reconstructions were performed for limb salvage and operations on varicose veins were only performed because of pigmentation, impending ulceration or ulceration.

During the first 6 months, the primary providers of the vascular services were one surgeon assisted by one medical assistant. A second medical assistant was assigned after 6 months, a staff nurse after 18 months, and a third

medical assistant after 20 months. Clinical specialists in surgery provided assistance on a rotational basis at "designated" operating sessions and occasionally at the outpatient clinic. The duty surgical and occasionally orthopaedic teams attended to patient care prior to, during, and after emergency operations out of normal working hours. In the wards, the surgical, orthopaedic (for limb trauma), medical (for vascular access) and paediatric (for paediatric vascular access) house staff contributed to patient care, as there was no designated vascular beds or house staff.

Apart from the lack of designated vascular service house staff, other problems included the lack of an independent designated operational budget. There have been instances where operative instrument sets were not sufficient to meet clinical need, when required for "back to back" vascular or vascular trauma emergencies requiring simultaneous or immediately consecutive emergency operative procedures and instrument sets. Technical expertise to deal with simultaneous vascular emergencies was often not

available and orthopaedic surgeons reluctantly had to undertake exploration for trauma associated limb ischaemia.

Over the 22 month period, 11 operative procedures were performed for the treatment of iatrogenic vascular events, 6 for haemorrhage, 3 for ischaemia and 2 for broken and "migrated" central venous catheters. Of these 11, 8 (72.7%) resulted in a favourable outcomes while 3 (27.3%) patients had major amputation, major amputation and subsequent death, and death respectively. Although the numbers of procedures are modest, the operative mortality (30 days) for ruptured abdominal aneurysms of 33.3% (3 of 9) and 0.57% (2 of 348) for vascular access construction are consistent with those of centres which report their results.

Because of the substantial numbers of vascular access construction procedures, retrospective analyses of databases were undertaken to answer numerous research questions. Among these were: (i) whether the side to side anastomosis was efficacious (Moissinac *et al.*, 2002), (ii) who is at risk of infection after vascular access reconstruction (Yeoh *et al.*, 2002), (iii) is urgent revision of a failing or failed haemodialysis fistula worthwhile (Liew & Moissinac, 2002), and (iv) can puncture for haemodialysis be performed within 24 hours of revision (Yeoh *et al.*, 2002).

A prospective study to evaluate whether patients were satisfied with vascular access construction procedures performed under local anaesthetic was undertaken as a quality evaluation exercise. This showed that the majority of patients were satisfied and were willing to undergo another subsequent vascular access or other type of procedure under local anaesthetic (Aznisah *et al.*, 2002).

Current research involve the construction and evaluation of the efficacy of reversed fistulas, triple flow fistulas and selective triple flow fistulas, in vascular access construction. Others include: (i) the vascular inflow improvement in patients with the diabetic foot, (ii) the conservative treatment of critical limb ischaemia (iii) markers of deep venous insufficiency and (iv) the anatomy of the median cubital vein complex in relation to strategic planning of haemodialysis vascular access construction.

Because of the substantial numbers of patients on the waiting list for vascular access construction, augmentation of the current "open access" service can provide a streamlined service, where, if adequate staff are available,

vascular and vascular access operating lists can take place daily enabling patients requiring urgent procedures to be scheduled or added on by nephrologists, oncologists, haematologists and paediatricians as required.

The requirement for vascular services at Hospital Pulau Pinang to augment services provided by the National Vascular Referral Centre at Hospital Kuala Lumpur is of substantial magnitude and on the increase. Maintenance of the current workload has been possible because of the dedication and good will of the staff involved. Based on current and potential workload, the vascular service at Hospital Pulau Pinang should perhaps comprise at least 2 Vascular and/or Vascular Access Surgeons, 2 Clinical Specialists, 4 Medical Officers and 6 Medical Assistants or Nurses working simultaneously as 4 teams with each team being simultaneously involved in (i) outpatient clinic consultations, (ii) non invasive vascular investigation (iii) vascular access construction, (iv) arterial and venous surgery and (v) emergencies.

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