

Nelson De Luccia, Karen Utsunomia,
Simon Benabou, and Karina Rosa Schneidwind

The Brazilian population profile for development of PAD is similar to many other western countries. PAD is one of the major causes of hospital admission for vascular disease of the population, particularly in the emergency setting.

Diabetes and tobacco use are still prevalent among the population. Related to tobacco use, Brazil's Ministry of Health has programs for tobacco control. One, as suggested by international agencies of public health includes pictorial health warnings (ash.org.uk/files/documents/ASH) on cigarette packages. This is very useful considering that PAD consequences of smoking, like the risk of amputation and gangrene, is poorly understood by the population.

The prevalence of smoking declined in the population above 18-year age from 34% in 1989 to 22% in 2003 and to 16% in 2006. General cigarette consumption between 1989 and 2005 fell 32% [1].

A population study conducted in the Rio de Janeiro city showed estimation of major lower

limb amputations in the age group between 55 and 74 years of 31.3/100,000 inhabitants, 209/100,000 diabetics and 359/100,000 PAD patients annually [2].

The overall urban Brazilian population rate of diabetes is estimated to be 7.6%. Men (7.5%) and women (7.6%) had similar rates of diabetes. Similar rates were present in whites (7.8%) and nonwhites (7.3%). Diabetes prevalence increased from 2.7% in the 30–39-year age group to 17.4% in the 60–69-year age group [3].

Brazil has a universal system of health care called SUS (Sistema Único de Saúde) inspired and somewhat similar to the National Health Service of the United Kingdom. The meaning is that every Brazilian citizen may have free access to the public hospitals and free medical care. With a population of more than 200 million people, and around 8% below the line of extreme poverty, social problems are still a major concern in Brazilian health care, and public hospitals work at the limit of their capacity. This creates a very unfavorable scenario in which many patients come on first time evaluation with unsalvageable limbs, related both to PAD or diabetic neuropathy complications, mainly infection in which a major amputation should be considered as the only possible treatment.

Brazilian Vascular Surgeons take care of diabetic patients with infected lesions in the feet, even if they are not ischemic, and palpable distal pulses are present. That seems a logical approach

N. De Luccia (✉)

Department of Surgery, Professor of Vascular and Endovascular Surgery, University of São Paulo, Av Dr Arnaldo 455, São Paulo 01246-904, Brazil
e-mail: nluccia@uol.com.br

K. Utsunomia • S. Benabou • K.R. Schneidwind
Department of Surgery, Vascular and Endovascular Surgeon, University of São Paulo, São Paulo, Brazil

from a certain point of view. If vascular surgeons perform all kind of amputation and surgical debridement in lower limb lesions after revascularization, they may as well treat non-ischemic patients. That also makes sense as some of these patients may require Vascular Evaluation when treated by other specialties. In Brazil there is no formal practice of podiatry like in the USA or some other European countries. The care of diabetic patients with foot lesions is shared between Orthopedic and Vascular Surgeons, but mainly by the Vascular Surgery team as the responsible medical specialty.

It's very impressive in our series the number of patients with gas gangrene, what may be referred to anaerobic infections presented. Although regular anaerobic cultures are not routinely performed to confirm diagnostic, the clinical presentation with gross infection, crepitation sensation at the subcutaneous level and eventually presence of gas on limb X-ray make the assumption of diagnosis pretty reasonable.

Figures 17.1 and 17.2 show demography of 168 patients in which any kind of amputation was performed from 2012 to 2013.

As can be observed in Fig. 17.1, infections (aerobic and anaerobic) are responsible for 33 % of all amputation; 42% of primary major

amputation, which means patients that presented with unsalvageable limbs, are caused by PAD; 19% are amputations secondary to a revascularization procedure.

The distribution by level shows that 42 % are minor amputation, considered below the ankle joint, and 56 % are major amputation. Proportion of transtibial amputation over transfemoral is 1.42, as a program of level preservation, including eventually revascularization procedure even just for that purpose is proposed [4]. Knee disarticulation as an amputation level is superior to the transfemoral under the rehabilitation point of view is also routinely practiced.

Although this high incidence of amputations is somber, strong programs of revascularization, by open or endovascular procedures, are widespread practiced in the country. The concept of limb salvage and the result enhanced quality of life when this purpose is achieved is well known, and supported by local published data [5].

A locally produced meta analysis [6], and practical aspects of the procedures also supports the policy of an angioplasty-first approach to the management of critical ischemia.

Patients in public hospitals, with critical limb ischemia and gangrene, but still with salvageable

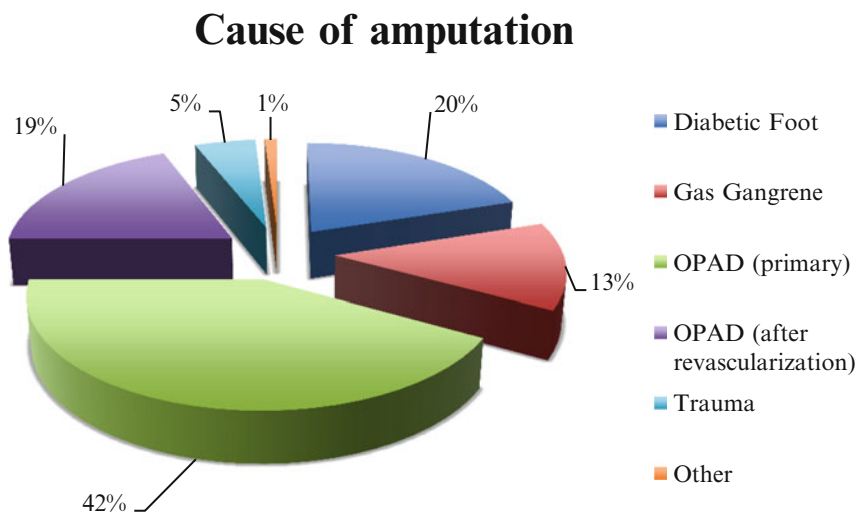


Fig. 17.1 Distribution of amputation by cause

Level of amputation

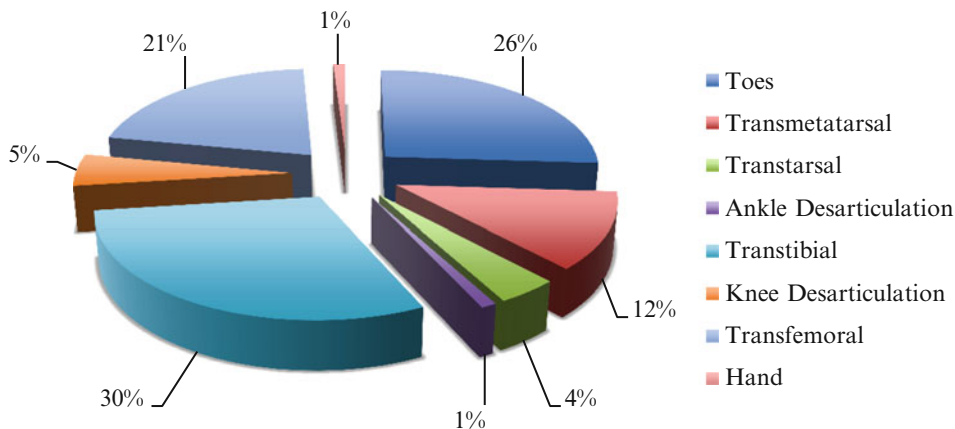


Fig. 17.2 Distribution of amputation by level

limbs, still may have to wait an average of 15 days to have initial treatment established, or by angioplasty or open surgery. That is due to the particular presentation of the clinical condition of patients with critical ischemia. Gangrene is not generally considered as urgent as a ruptured aneurysm, for obvious reasons, or as many other surgical emergencies. This way, in a system overloaded by surgical emergencies, toe gangrene patients may be waiting in line, and eventually losing the opportunity to have their limbs saved.

Commonly a patient with critical limb ischemia will be evaluated with an angioCT, as this is a simple and available exam in the emergency setting. Based on these examinations, patients are conducted to either angioplasty or open surgical procedures. Regular angiography are still done, but mainly by the surgeon at the Operating Room setting, and eventually progressed to angioplasty when judged feasible.

The policy of angioplasty first, besides having support from medical literature, represents a practical approach to limb threatening ischemia. Patients can be conducted faster to the operating room were mainly are treated with a portable C-arm, eventually under local anesthesia and not demanding intensive care unit for the post operative period, what is usually critical in a system with shortage of hospital beds.

At least in the public hospitals setting only critical ischemia patients are considered for treatment. Usually no intermittent claudication patients are treated, except few situations at the aorto iliac territory.

Review of one single institution, the major Brazilian public hospital, from the University of São Paulo, during the period of 1 year (2013–2014) showed that from 523 vascular interventions, 139 (26.5%) were for PAD and critical ischemia, of these 51.3% being angioplasty, 39.5% bypass grafts and 9.2% endarterectomy. Distribution by territory showed 24 (17.1%) at the aortoiliac segment (14 grafts, 10 angioplasties), 82 (59.2%) femoro popliteal (21 grafts, 50 angioplasties and 11 endarterectomies) and 33 (23.7%) femoro distal (11 grafts and 22 angioplasties).

General data from the Brazilian National experience (datusus) of the month of May 2015, in the southeast region of the country reported 133 angioplasties over 30 grafts done for PAD.

Although this documented shift towards endovascular procedures, open surgery experience is very consistently done for limb preservation, when its judged that the case is not amenable to angioplasty, by the extension of arterial disease, or after failed attempt of angioplasty.

Autogenous reconstruction by the use of the saphenous vein is the technique more consistently

used. Variations include the reversed vein, “in situ” or the non-reversed technique. Personal experience of the major Brazilian service is the use of the saphenous vein by the non reversed technique, removed from its bed by small bridge incisions so the best vein segment is interposed between the best donor and recipient arteries.

The use of arm veins [7], revascularization of perigeniculate arteries [8], and alternative access to leg arteries [9] exemplify the trend and tradition of Brazilian Vascular Surgery towards open procedures to limb salvage.

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