"I marvel that society would pay a surgeon a large sum of money to remove a person’s leg, but nothing to save it.” – George Bernard Shaw

What AILS the diagnosis of PAD/CLI/CLTI in India?

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Can we edify the professionals and public about this calamity?

Keywords: PAD – Peripheral Arterial Disease; CLI – Critical Limb Ischemia, to be renamed; CLTI – Critical Limb-threatening Ischemia

The above two queries are bound to raise some eyebrows – as some may take affront that the questions imply peripheral arterial disease (PAD) is inadequately diagnosed and the professionals and public need to be enlightened about the perils of these diseases. Regrettably, this remains true of a large part of our society, medical or otherwise, without slighting or being judgmental of their knowledge or efforts. The fault lies in the system – in education, awareness, recognition by health administrators/insurers, etc. Is it calamitous? – It indeed is, as the vascular specialists are cognizant of its inimical effects. There is very little awareness that limb loss (amputation) is the harbinger of future life loss as depicted below [Figure 1].

Figure 1: Relative comparative mortality in PAD, amputation and malignancies

That the PAD (symptomatic or not) reflects the global atherosclerotic burden and predictor of future cardiovascular (CV) events for that patient more than any other system is poorly recognized. The prevalence of atherosclerosis in the coronary, carotid, and renal arteries is higher in patients with PAD than in those without PAD.[1] More importantly, this documented truism is not usually accepted and sometimes scoffed at by medical profession. The vascular specialists have often heard from other doctors that “… amputation is easier on the patient and cheaper option than revascularization…;”

How to cite this article: Suresh KR. What ails diagnosis of peripheral arterial disease/critical limb ischemia/critical limb-threatening ischemia in India? Indian J Vasc Endovasc Surg 2017;4:139-42.

Received: September, 2017. Accepted: September, 2017.
we know these uninformed assertions are absolutely indecorous since the entire evidence world over decries this as iniquitous.

The oft-repeated reason “the patient presented late” or “sought alternative therapies” does not seem to be factual (our and many vascular specialists’ personal experience; not published data). Typically, a patient with critical limb-threatening ischemia (CLTI) visits a local doctor first – many times a physician, orthopedics, general surgeon, plastic surgeon, or others, mostly early in the course of the disease. Unfortunately, the correct diagnosis is either missed or delayed; but more regrettable is the further delay in referral to a qualified vascular surgeon, even if they are within reachable distance. Sadly, there are less than 100 vascular surgeons/specialists across India.

The following patient [Figure 2] represents the flow of events, which is disappointingly the rule than exception:

Figure 2: Trials (and tribulations) of a patient with CLI/CLTI; these patients become nomadic as they are shunted from one health-care facility to another

This was within 50 km of a large metropolitan city, which has one of the highest concentrations of vascular surgeons/specialists in the country. He sought alternative medicine only after our system failed to provide relief and “super specialty CV hospital” had no vascular surgeon who could perform a distal vein bypass.

Is amputation “cheaper” than limb salvage? The lifetime cost is three times more for amputees than for those whose limbs are salvaged[2] and this holds true for India. Amputation in low-income male patients, who are under 50 years, is quite devastating for the entire family. He is likely to be the lone breadwinner for the family, a manual worker, and with poor rehabilitative/prosthetic services; he is virtually without any chance of attaining a reasonable functional status, let alone getting back to work. Also, the quality of daily life and the fate of the other limb and life are not usually considered by the amputating surgeon. It seems to be an easier option for the surgeon, but not for the patient.

“Compared with other surgical procedures, major amputations have high perioperative morbidity and mortality, as well as high revision rates. Above-knee amputation (AKA) and below-knee amputation (BKA) are among the top five surgical procedures with the highest perioperative mortality.[3] Five percent to 10% of BKA patients and 15% to 20% of AKA patients die in the hospital before discharge.[4-7] Rates of perioperative mortality for infrainguinal bypass and endovascular revascularization are 2%–8% and 1%–3%, respectively.[8-14]

The exponential increase in diabetes in India has led to serious raise in PAD/CLTI. The scourge of “gangrene” was first recognized by Sir William Osler who stated in 1908 that “… thickening of the arteries in diabetes mellitus (DM)… may be due to action of the poisons on the blood vessels retained within the system…” and after the discovery of insulin, Joslyn (1934 – Menace of Diabetic Gangrene) made this profound statement “… Diabetic coma has fallen, but deaths from gangrene of foot and leg have increased significantly… gangrene deserves more intense study and the investigation of cause of arteriosclerosis…gangrene is not heaven-sent, but earth-born…” Unfortunately, in India, we are still living in the Joslyn’s era. “Gangrene is earth-born” as the external injury from barefoot walking and minor foot procedures without any vascular evaluation, then delayed referral to a vascular surgeon leads to serious threat to limb and life.

Diabetes will continue to rise in India as seen in the International Diabetes Foundation atlas of 2015 [Figure 3]. Both in diabetics and nondiabetics, the lower limb arteries are the most affected by atherosclerosis as seen in this table (Dutch Epidemiological study[15]).
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Indian Journal of Vascular and Endovascular Surgery | Volume 4 | Issue 4 | October-December 2017

Figure 3: International Diabetes Foundation 2015 data on worldwide distribution of diabetes mellitus and the projected disease burden by 2040. Worldwide, 2015-415 million diabetics; 2040 – 642 million with the highest increase in Southeast Asia and Africa

• Prevalence of vascular disease - 50–75 years

| Vascular Disease | DM | Non-DM |
|-----------------|----|--------|
| Carotid         | 8.7%| 2.8%   |
| Arm arteries    | 2.3%| 0%     |
| Leg arteries    | 31.8%| 18.4%  |
| Crural arteries | 21% | 16%    |
| Coronaries      | 21% | 11%    |
| Ankle Brachial  | Index <0.90 | 41.8% | 18.1% |

• Among 72 million diabetics in India
• 72,000 will develop CLTI annually (1000 per million) – only about 3000 lower limb revascularizations are performed in India!!
• Among the rest of the population – 485,000 will develop CLTI annually (500 per million) (? 100,000 have TAO)
• PVD in the entire population – 3.8 million (380 per 100,000).

Robust and reliable data are hard to find in India. Assuming that our PAD/CLTI incidence is lower than those quoted in literature, we will still be facing a very large population with CLTI who are likely to lose limb and/or life!

There are a multitude of reasons for this delayed presentation by patients and referral to vascular surgeons in India. There is very poor public awareness about vascular diseases – a “leg attack” does not raise the same level of concern as “chest pain/heart attack,” though it may be equally dangerous, if not more. But, the concern is that the health-care professionals have the same indifference. The reasons to enumerate a few:

1. Failure of proper diagnosis since this is NOT in the teaching curriculum
2. This leads to incomplete examination of the patient – pedal pulses are rarely examined in a patient with leg pain. Even when diagnosed, they are generally diagnosed as TAO (Buerger’s disease) without application of any criteria
3. Hence many, if not most, are referred to nonvascular surgeons or to those with only a marginal knowledge about the diagnosis and treatment of vascular diseases. This leads to gross undertreatment and at times overzealous approach with unnecessary invasive diagnostic workup and interventions
4. Severe underestimation of local and systemic impact of the disease
5. Regrettably, several therapies which are not beneficial or even harmful (chelation, omentopexy, etc.) are still practiced
6. Since these procedures were performed earlier by nonvascular surgeons, there was a lack of “belief” in vascular procedures, which now is replaced, in a limited degree, by unusual expectations
7. Perhaps, the worst possible reason is “…the patient can’t afford it…” Perchance those who profess this doctrine should pause to think “…can the patient do without it…” and if they advise unnecessary amputation, they need to evaluate economic, medical, social, and quality of life impacts and need to realize whether the burden of these impacts is significantly lower in most patients who undergo revascularization.
These lead to delayed referral with its inherent serious consequences:
1. Late referral results in patient presenting in sepsis with its systemic complications
2. Patient will need to undergo multiple procedures (several wound debridement, revascularization). This comes at a cost of increased morbidity and mortality
3. This also lowers the chances of functional limb salvage in spite of successful revascularization
4. Increase in systemic events such as major adverse cardiac events, renal dysfunctions, and others markedly increases patient morbidity and mortality.
5. Since the patient comes with septic foot/significant wound burden, the healing process is prolonged even with the best available care
6. Overall cost of therapy, apart from time to wound healing, is markedly increased.

**EPILOGUE on a bit of positive note** - there is an ubiquitous increase in the awareness of vascular diseases, but I dare say less than 10% of these patients reach vascular surgeons. This again is an assumption, but may not be far from truth.

From “Doctors Dilemma,” 1909

George Bernard Shaw would have urged the society to spend more on saving legs (and life) than severing them!

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