

## Pattern of Limb Ischemia in Khartoum

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### Abstract

**Background:** Limb ischemia, mainly lower limb, is a common clinical problem. Peripheral arterial disease (PAD) can be manifested as chronic ischemic pain or ulcer or gangrene. Increased risk of PAD with increasing age, NIDDM or impaired glucose tolerance mainly manifested as glycosuria, cigarette smoking, hypertension & hypercholesterolemia. Smoking, cholesterol, weight are risk factors. Some studies show gender variations. Occlusive peripheral arterial disease is manifested by intermittent claudication. Multidisciplinary approach is recommended in management of chronic limb ischemia (CLI).

**Methods:** A descriptive prospective study, conducted in 76 patients in a period of three (3) years. A questionnaire designed beforehand was used in data collection; containing personal data, mode of presentation, site of ischemia, the risk factors, the investigations' results, the treatment and complications. Data was analyzed using statistical package for social science (SPSS).

**Results:** In 76 with 82 ischemic limbs. Male to female ratio was 1.3:1. The mean age of the patients was 63 ( $\pm 12.3$ ) years (30-89 years). Lower limb ischemia was more common than upper limb ischemia; 46.3% each right & left lower limbs, 5% for the right upper limb and 2.4% for the left upper limb. Thirty nine percent (39%) presented with features of acute limb ischemia. Most of the patients presented in winter (62.2%). Co morbidity includes diabetes mellitus (47.4%) and hypertension (32.9). All patients presented with two or more classical features of limb ischemia; pain was the most dominant symptom which occurs in 85.5% of the patients.

**Conclusion:** The majority of the patients were in the age group between 70-79 years (32.9%). Lower limb ischemia was more common than upper limb ischemia; (92.6% and 7.4% respectively). Most of patients (70%) ended up by major limb amputation.

**Keywords:** disease; surgery; hypertension; cardiovascular; bypass; anesthesia

### Introduction

Limb ischemia, mainly lower limb, is a common clinical problem. In the late 20th century, 0.9% of hospital admissions were due to limb ischemia [1]. Since the late last century up to recent years, incidence of limb ischemia was estimated 10- 16% of vascular cases which is about 14 per 100,000 in UK, almost similar figures in Iran (17 per 100,000), while in Austria it was higher 50-100 per 100,000 [2-4]. There is no evidence of seasonal variation of limb ischemia as compared to ischemic heart disease but some studies showed a non-uniform seasonal pattern [5-7]. Peripheral arterial disease (PAD) can be manifested as chronic ischemic pain or ulcer or gangrene and these manifestations are known as critical limb ischemia (CLI) [3]. Increased risk of PAD with increasing age, NIDDM or impaired glucose tolerance mainly manifested as glycosuria, cigarette smoking, hypertension & hypercholesterolemia [8-13]. Some studies showed increased adverse effect of smoking in men than women [12]. There is gender difference in development of limb ischemia and outcome of

reconstruction surgery. Some studies showed that female gender may have more protection, less atherosclerosis and better postoperative outcome [10,12-16]. while other studies showed the contrary, that female gender is associated with higher mortality in chronic limb ischemia, higher rate of perioperative myocardial infarction in arterial bypass grafting & higher graft failure [8,17-20]. Some of the risk factors like age, diabetes, coronary heart disease & presence of contra- lateral limb ischemia may affect the outcome of bypass surgery adversely [21]. In some studies serum cholesterol, relative weight & hematocrit are weak risk factors. Peripheral arterial occlusion (PAO) is mainly caused by thrombosis & embolism [22]. In about 10- 15% of acute limb ischemia, differentiation based on clinical assessment alone between them is very difficult [2]. Occlusive peripheral arterial disease is manifested by intermittent claudication (IC) [10]. Multidisciplinary approach is recommended in management of CLI to control pain and risk factors as diabetes and cardiovascular diseases [3,23]. Critical limb ischemia

(CLI) may be treated by analgesia or amputation [24]. Amputation rate following acute limb ischemia is estimated by 10-30% & mortality rate by 7-25% [2,4]. In the second half of the last century, the increase in use of balloon angioplasty and arterial reconstruction reduced the rate of major amputation [25,26]. In Khartoum Teaching Hospital, the main general hospital in the capital of Sudan, vascular surgery is part of the general surgery. In this study we aimed at studying the pattern, risk factors, presentation, management, morbidity & mortality of limb ischemia.

### Justification

The authors observed that although limb ischemia, mainly lower, is one of the major health problems and one of the leading causes of major lower limb amputation in Sudan, but there are not enough researches related to its causes and consequences.

### Patients & Methods

This is a descriptive prospective study, conducted at Khartoum teaching hospital (KTH). It included all patients admitted with non-traumatic limb ischemia in a duration of three (3) years. A questionnaire designed beforehand was used in data collection; containing personal data, mode of presentation, site of ischemia, season of presentation, clinical features, risk factors, comorbid disease, cigarette smoking and obesity. All patient had full physical examination including general, systemic and local examination. Electrocardiography (ECG), Doppler ultrasonography (US), chest x-ray, serum cholesterol, renal profile, hemoglobin level (Hb%) and urine analysis were done for all patients. Management offered to the patients included heparin, warfarin, aspirin and third generation cephalosporin. Debridement or amputation was done for some patients. Embolectomy was done for three patients where local anesthesia was used, through femoral incision and Fogarty catheter; arteriotomy was longitudinal and the arterial incision was closed using Polypropylene 6/0. All patients were followed for complications for 3-30 month. Complications e.g., infection, sepsis and mortality were documented. Data was analyzed using statistical package for social science (SPSS).

### Results

The total number of patients was 76 with 82 ischemic limbs. Male to female ratio was 1.3:1; all patients were married except one. The mean age of the patients in

the study sample was 63 ( $\pm 12.3$ ) years; ranging between 30 and 89 years. The majority of the patients were in the age group between 70-79 years (32.9%). Half of the patients were from the central region of the Sudan including the capital city, 22% of the patients were from the west, 12.2% of the patients were from the north, 9.8% of the patients were from the south and 6.1 of the patients were from the east. Lower limb ischemia was more common than upper limb ischemia; 46.3% each right & left lower limbs, 5% for the right upper limb and 2.4% for the left upper limb. Bilateral lower limbs ischemia occurs in six patients, however there are no bilateral upper limbs or upper and lower limbs ischemia in the same patient. Concerning the presentation of the patients, 39% presented with features of acute limb ischemia, 32.9% with features of chronic limbs ischemia and 28% with features of acute on chronic limb ischemia. Most of the patients presented in winter (62.2%), 20.7% of the patients presented during summer & 17.1% of the patients presented at autumn. With regard to the co morbid risk factors in patients of limb ischemia, diabetes mellitus is the most predisposing factor which comprised 47.4% and commonly affect age group 70-79 years; 32.9% of the patients had hypertension, 26.3% of patients had cardiovascular disease, 25.0% of the patients were smokers, 15.8% were passive smokers, 17.1% of the patients were recumbent and 10.5% of the patient were obese. All patients presented with two or more classical features of limb ischemia, pain was the most dominant symptom which occurs in 85.5% of the patients which was severe and not responding to analgesia, 79.3% of the patients had cold periphery, 89% had black discoloration, 85.4% of the patient had gangrene, 90.2% had pulselessness, 41.5% had an ulcer and 39.0% had claudication. More than two fifth (41.1%) of the patients had a history of cardiac disease & 11% of the patients had history of limb ischemia. Concerning the family history obtained from the patients, diabetes mellitus and hypertension were predominant and they occur in 35.4% and 34.1% respectively. Despite the availability of investigations no one of the patients of limb ischemia had peripheral or aortic aneurysm. Regarding the other modalities of treatment in the patients of limb ischemia, only 3.7% underwent embolectomy for lower limb, using Fogarty catheter through inguinal incision and under local anesthesia. Seventy percent (70%) of the patients had major limb amputation above or below knee (AKA, BKA) and 9.8% of the patients with limb ischemia had minor limb amputation e.g., toe

amputation & transmetatarsal amputation (TMA). About five per-cent had no amputation. Looking for post-operative complications following surgery, 35.4% of the patients with limb ischemia developed infection which required treatment by antibiotics and dressing of the wound, 3.7% of the patient's developed septicemia and were treated by third generation cephalosporin. Mortality occurred in 12(14.6%) of the patients, five of the them died in the hospital while 7 died at home in the period ranging from 3 to 24 months.

## Discussion

The distribution of the study sample according to the residence; half of the patients with limb ischemia were from Central part of the Sudan (including the Capital), 22% from the West, 12.2% from the North, 9.8% from the South and 6.1% from the East. This distribution may be explained by accessibility to the health services in the capital city & the central region mainly. The majority of the patients in the studied population were males; male: female ratio 1.3:1. This is similar to the literature and it may be explained by atherosclerosis which is considered as the commonest cause of limb ischemia, it affects males more than females [1]. The mean age of the patients in this study sample 63 ( $\pm 12.3$ ) years and the commonest age group affected is 70-79 followed by 60-69 years. In comparison to other studies in which the mean age of patients with limb ischemia was  $64 \pm 16$  years and the common age of presentation is 50-70 [1,4]. Most of the patients presented with symptoms & signs of late limb threatening ischemia. The commonest symptom was discoloration in 89%, followed by pain & coldness in 85.4% and 79.3% respectively. Only 39.0% presented with typical claudication & they could describe its distance. At time of presentation, 90.2% had completely absent distal pulses & 85.4% had gangrenous limbs. This emphasizes the late presentation of our patients as the majority presented after the limb is already dead! In the literature pain and coldness were the most prevalent symptoms representing more than 80% & more than 60% respectively [4]. Most of the patients with limb ischemia (62.2%) presented in winter, 20.7% during summer and 7.1% during autumn. This may herald that cold weather play major role for development of limb ischemia, because it may lead to the peripheral vasoconstriction. This is different from other studies which showed no uniform seasonal variation [5-7]. Regarding the co-morbid disease, 47.4% of our

patients were diabetics, 32.9% hypertensive and 26.3% had cardiac disease. Smokers & passive smokers were 25.0% and 15.8% respectively. Smoking is a commonly known risk factor of atherosclerosis [1]. Similar factors are demonstrated elsewhere with different percentages; smoking, age, coronary heart disease, diabetes and relative weight are risk factors of development of limb ischemia and its causes as atherosclerosis [1,4,10,12,13,21]. With regard to the surgical intervention in the patients of limb ischemia, only 3.7% of patients underwent exploration and thromboembolism and fortunately the results were good and this led to limb salvage but the number is too small to be compared to literature! The majority of patients in our study sample underwent amputation, 85.4% and 9.8% for major and minor limb amputation respectively. This is high in comparison to some studies which showed major amputation rates of 10-30% [2,4]. Mortality rate was found to be 14.6% which is comparable to other studies [2,4].

## Conclusion

The majority of the patients were in the age group between 70-79 years (32.9%). Lower limb ischemia was more common than upper limb ischemia; (92.6% and 7.4% respectively). Most of patients (70%) ended up by major limb amputation.

## References

1. Rai K M. (2009). Approach to management of chronic lower limb ischemia. *Journal of JMC-Nepal*, 2(2):77-88.
2. Dormandy J, Heeck L, Vig S. (1999). Acute Limb ischemia. *Semin*, 12(2):148-153.
3. Minar E. (2009). Critical limb ischemia. *Hemostaseologie*, 29(1):102-109.
4. Mozaffar M, Malekpour F. (2004). Embolectomy for acute limb ischemia. *Medical Journal of the Islamic Republic of Iran*, 18(2):131-134.
5. Varty K, Reid A, Jagger C, Bell P R. (1995). Vascular emergencies: what's in season? *Cardiovasc Surg*, 3(4):409-411.
6. John T G, Stonebridge P A. (1993). Seasonal variation in operations for ruptured abdominal aortic aneurysm and acute lower limb ischemia. *J R Coll Surg Edinb*, 38(3):161-162.
7. Kuukasjärvi P, Salenius JP, Lepäntalo M, Luther M, Ylönen K. (2000). Weekly and seasonal variation of hospital admissions and outcome in patients with acute lower limb ischemia treated by

- surgical and endovascular means. *Int Angiol*, 19(4):354-357.
8. Cheng S W, Ting A C, Lau H, Wong J. (2000). Survival in patients with chronic lower extremity ischemia: a risk factor analysis. *Ann Vasc*, 14(2):158-165.
  9. Hiatt W R, Hoag S, Hamman R F. (1995). Effect of diagnostic criteria on the prevalence of peripheral arterial disease. The San Luis Valley Diabetes Study. *Circulation*, 91(5):1472-1479.
  10. Kannel W B, McGee D L. (1985). Update on some epidemiologic features of intermittent claudication: the Framingham Study. *J Am Geriatr Soc*, 33(1):13-18.
  11. Price J F, Mowbray P I, Lee A J, Rumley A, Lowe G D, Fowkes F G. (1999). Relationship between smoking and cardiovascular risk factors in the development of peripheral arterial disease and coronary artery disease: Edinburgh Artery Study. *Eur Heart*, 20(5):344-353.
  12. Garipey J, Denarie N, Chironi G, Salomon J, Levenson J, Simon A. (2000). Gender difference in the influence of smoking on arterial wall thickness. *Atherosclerosis*, 153(1):139-145.
  13. Stensland-Bugge E, Bønaa K H, Joakimsen O, Njølstad I. (2000). Sex difference in the relationship of risk factors to subclinical carotid atherosclerosis measured 15 years later: the Tromsø study. *Stroke*, 31(3):574-581.
  14. Enzler M A, Ruoss M, Seifert B, Berger M. (1996). The influence of gender on the outcome of arterial procedures in the lower extremity. *Eur J Vasc Endovasc Surg*, 11(4):446-452.
  15. Roddy S P, Darling R C 3rd, Maharaj D, et al. (2003). Gender-related differences in outcome: an analysis of 5880 infrainguinal arterial reconstructions. *J Vasc Surg*, 37(2):399-402.
  16. Al-Omran M, Tu J V, Johnston K W, Mamdani M M, Kucey D S. (2003). Outcome of revascularization procedures for peripheral arterial occlusive disease in Ontario between 1991 and 1998: a population-based study. *J Vasc Surg*, 38(2):279-288.
  17. AhChong A K, Chiu K M, Wong M, Yip A W. (2002). The influence of gender difference on the outcome of infrainguinal bypass for critical limb ischemia in Chinese patients. *Eur J Vasc Endovasc Surg*, 23(2):134-139.
  18. Mays B W, Towne J B, Fitzpatrick C M, et al. (1999). Women have increased risk of perioperative myocardial infarction and a higher long-term mortality rate after lower extremity arterial bypass grafting. *J Vasc Surg*, 29(5):807-813.
  19. Watson H R, Schroeder T V, Simms M H, Horrocks M. (2000). Association of sex with patency of femorodistal bypass grafts. *Eur J Vasc Endovasc Surg*, 20(1):61-66.
  20. Timaran C H, Stevens S L, Freeman M B, Goldman M H. (2002). Predictors for adverse outcome after iliac angioplasty and stenting for limb-threatening ischemia, 36(3):507-513.
  21. Tarry W C, Walsh D B, Birkmeyer N J, Fillinger M F, Zwolak R M, Cronewett J L. (1998). Fate of contralateral leg after infrainguinal bypass. *J Vasc Surg*, 27(6):1039-1048.
  22. Giannini D, Balbarini A. (2004). Thrombolytic therapy in peripheral arterial disease. *Curr Drug Targets Cardiovasc Haemat Disord*, 4(3):249-258.
  23. Cheng K S, Baker C R, Hamilton G, Hoeks A P, Seifalian A M. (2002). E. *J Vasc Endovasc Surg*, 24(5):383-397.
  24. Beard J D. Which is the best revascularization for critical limb ischemia: Endovascular or open surgery? *J Vasc Surg*, 48(6 Suppl):11S-16S.
  25. Hallett J W Jr, Byrne J, Gayari M M, Ilstrup D M, Jacobsen S J, Grsay D T. (1997). Impact of arterial surgery and balloon angioplasty on amputation: a population-based study of 1155 procedures between 1973 and 1992. *J Vasc Surg*, 25(1):29-38.
  26. Conte M S, Belkin M, Upchurch G R, Mannick J A, Whittemore A D, Donaldson M C. (2001). Impact of increasing comorbidity on infrainguinal reconstruction: a 20-year perspective. *Ann Surg*, 233(3):445-452.

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