ORIGINAL COMMUNICATION:

Pattern Of Peripheral Vascular Disease In An African Country.

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Abstract:

Background: *Penpheral vascular disease (PVD) is important because of irs high morbidity and association with coronary artery and cerebrovasc11/ar diseases.Its characterishcs varyfrom country tocountry. Reports ofthis disea.refromSub-SaharanAfrica arescarce.*

Objective: *Todescribe thepattern ofperipheral vasculardiuа_e ina Kenyan referral hospital.*

*Study **design and** serting:Retrospective cross-sectional srudy at Kenyatta National Hospital. Nairobi, Kenya.*

Patients and methods: *Records of in-patients with diagnosis ofperipheral vascular diseasefrom January 1999 toDecember 2008 were examined for mode of diognosis, site, rislclcomorbidity, age, gender and 011tcome. Data were analysed IYy SPSS version 11.50for windows andpresented using tables, harand pie charts.*

Results: *One hundred and fifty seven (97 male, 60female) records were analysed. Diagnosis was made by angiography (59.9".4}, clinically (33.1%) and duplex ultrasound (7.004). Most commonly affected arteries werefemoral (45%); popliteal {19%); iliac (14%) and tibial (7%). Mean age was 60.5years, with male:female ratio of 1.6:I. Hypertension was tire most common risk/actor (45.9%), followed by diabc1es mel/iws (36.3%), .tmoking (29.9%). alcohol (16.6%). infection (12.1%) and connective tissue disease (7.6%). Jschaemic heart diiease and stroke were co-morbidies in 13 4%and 8.9"/ocases respectively.Amputatlbn was done in39.4% and death occ11rred in10.2%ofcase.i.*

Conclusion: Peripheral vascular disease in the study pop11lation predominantly affected thefemoro-popliteal segment and was more common inmales thanfemales .It oce11rs a decade earlierthan in Caucasianpop11lations in thar, be.(ideshypertension.diabetes mel/itus ,and smoking, infecnollS conditions conslil11ted a significant risk.

Key words: Peripheral ,·asculardisease. Africa. Kenya

Introduction:

Peripheral vascular disease (PVD) isimportant because ofitshigh association with coronary artery and cerebrovascular diseases (Golomb *et al.*, 2006: Steffen *et al.*. 2008). Its characteristics display ethnic and geographical variation (Khawajn *et al.*, 2007; Bennett *et al.*. 2009). In Sub-Saharan Africa, reports from Southern Africa indicate that it is an established problem and its prevalence is high compared to other African countries (Robbs, 1985: Kumar *et al.*. 2007). Further. the distribution of Ankle Brachia! Pressure Index (ABPI) in rural African populations has beenreported to be similar to that reported in Western populations. suggesting that this population has peripheral atheroma and is at increased risk of future cardiovascular events (Fowkes *et al.*, 2006). In Kenya, clinical studies reveal that it is a leading cause of lower ltmb amputations (Awori and Ating'a, 2007). The pattern of peripheral vascular disease in Africa, however, remains under-reported. This study describes the characteristics of peripheral "asculardi:.ease in a Kenyan reaching and referral hospital.

Patients and Methods:

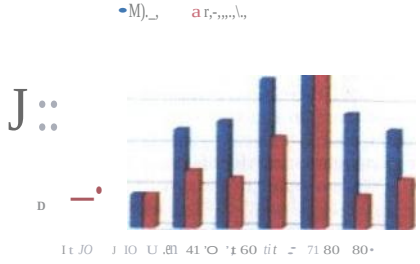
This was a retrospective study done at Kenyatta National Hospital K.N.H. - an 1800 bed capacity level VI Eastern and Central African referral hospital inKenya. with an annual in-patient turn-over of 80,000 patients. It has 41 thoracic and cardiovascular beds and IO thoracic and cardiovascular surgeons.

Ethical approval for the study was granted by the Kenyatta National Hospital/University of Nairobi Ethics and Research Committee. Records of patients with peripheral vascular disease, admitted over a IO year period from January 1999 to December 2008 were retrieved from the hospital registry. Patients were categorized into male and female, and each gender divided into nine IO year age groups, starting at year one. Each category was examined for mode of diagnosis, arterial site involved, risk factor/comorbidity. aae and gender distribution, and outcome. Records in which any of the data above were missing were excluded from analysis.

Data obtained were analysed using SPSS for windows version 11.50 2002 (Chicago Illinois) and presented in form of tables, bar and piecharts.

Results:

One hundred and sixty eight cases of peripheral vascular disease were examined. Eleven of them were excluded, 7 in which the age and 4 the site were not specilied and were exclued from cbe study. One hundTed aod fifty seven (97 male :60 female), **age range** 12-89 years, were included and analysed. Diagnosis had been made clinically by ABPI S0.9 33.1%.Io all cases of ABPl:::: 0.8 and in whom the level or sitewas uncertain, the diagnosis was confirmed by angiography(59.9%)and Doppler ultrasonography (7.00/o).



Flgan t: **Alt and 19dtrdistribution of pufpllltral •Mattar dlseue at Kettyaiu Natloaal Hotpltal**

Age and gender distribution :

Mean age was 60.5 years (range 13-89 years), lower in female (58.1 years) lhan in males (62.0) years). Most commonly affeelcd age group was 51 - 70 years. Over 30°•of the paueot) were aged 50 yenrs 11nd below.M11le:Female ratio was 1.6:I with clear male

Arterial site JocaUzatlon :

Arterial sites involved were femoral (45%), poplitcal (19%), iliac (14o): ubrnl (7%); and small vessels (7°t,,). In 7°{. of the casCl>. more lbllnone arteries were involved *(figure 2)*.

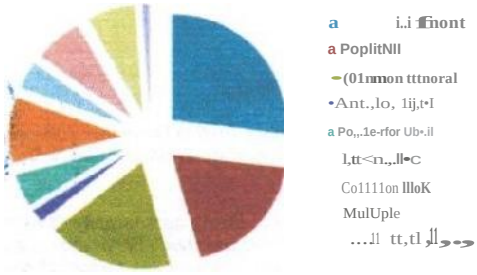


***Figure** 2.* **Arterial** aegmeots/sltH ln 'l'ohed In peripheral a.rtery **diseaseat KII' J,**

There were subtle geodcrdi!Terences in the arteries involved. For example, while in superficial femoral, popliteal and external iliac there was clear male predominance . the common femoral wa more affected in fmales *(Table 1)*.

Tab/11 I: Geer distribution of site Involvement

Artery	Gender	
	\1ale	Female
Superficial femoral	20	14
Poplitcal	25	5
Common femoral	10	18
Anterior tibial	2	0
Posterior tibinl	2	6
External iliac	14	2
Common ihac	12	6
Multiple	6	5
Small ve!>sel disease	6	4
Total	97	60

Risk factorsand co-morbidJties:

Hypertenston was the most frequent nsk factor (45.9%), followed by diabetes Mellitus (36.3%), smokmg (29.9%). alcohol (16.6%).trauma (8.3%), infection (12.1%), connective tissue disease (7.6%) and radiotherapy (5.7%). Alcohol was observed in combinntion with hypertension (40-lo), ,moking (45%) and infection (15%). There \\>ere notable gender difference. in preponderance of risk factors. For instance hypenension was more common in females, while diabetes mellilus, smoking and alcohol **were** more common in males.The others occurred in nearly equal proportion,.Coronary ortery and cerebrovascular diseases were notable co-morbidities in 13.4% and **8.9%** casesrespccuvcly. *(FigureJ)*.

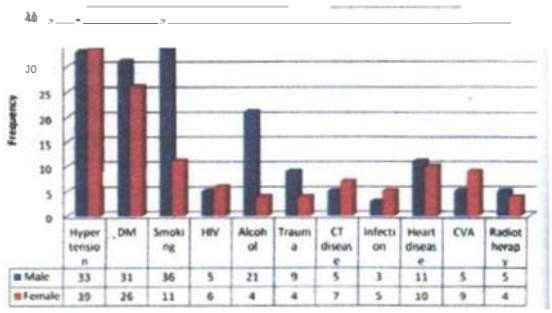


Figure 3: Gender distribution of risk factor, and co-morbidities.

Outcome:

Fortv two per cent of lhc ca:.cs were managed conservatively and discharged Amputation wa done m (39.5%) of cases. Thirteen patients ctU%) suffered dcfonmty and 16(I0.2%) died *(fable2)*.

Table 2· Outcome of PVD

Outcome	Count (%)
Recovery	66 (42)
Amputation	62 (39.5)
Death	16 (10.2)
Dcfonnity	13 (8.3)
Total	157

Discussion:

Observation of the precnt srudy reveal that in a single hospua. there were almost rwo cae of symptomatic PVD every month. Considering that a large number of PVD cases are asymptomic (Eason *et al.*. 2005), this suggests that the disease is more common than hithcno **perceived**.

These findings arc concordalll with those of i;tud1c on South African popula£ion hich reHial htgb prevalence of PVD (Kumar *et al* .:?007) The) ,uggcst !hat. with increasing card10, ascu1ar nsk fo..:tor, bemg reported in Subsahoran Africa (Akinboboye *er al* 0031,a nse m th1.s disease is imminent

Site Dlstrlbutlon:

Observations of the current study reveal. similar to literature report (Smith *eı al*.. 1996; Seo *et al.*, 1996), that the femoro-popliteal egmcnl 1s the most commonly invohed In other studies however. there 1 more widespread mvolvcmcnt w11h preponderance of aorto-tliae $egmcnts, and substantial mvolvemcnt of the t1bio-peroneal ones (Hansen *ct al*.. 1995: Wilkstrom *ct al*.. 2009). This suggests div1.:rsity in site mvolvcment of PVD. Thisdiversity may be related to age, gender, and d1!Terent clinical risk factors profile (Diehm *et lll*.. 2006; Ozkan *et al*., 2009). The differeneel> m site involvement are reflected in everity ofdtseae. For example, whereas intermittent claudicat 1011 is siguifo.:antly associated with aorto-11iae disease, critical limb ischaem111 is associated with fcmoro-popliteal (crural) diea. e (Ozkan ,.,, *al*.. 2009). Accordingly. the preponderan1 involvement of the distal segments obened in the current sn1dy implies worse outcome w11h a greater hlc.elihood of the need for amputation. Indeed, a large number of the patients (39.4%) suffered amputations.

Risk faclors/co-morbiditie :

The present study reveals, similar to literature reports. that hypenension, diabetes mellitus and smoking are the leading predisposing factors (Smith *et al.*.1996: Bartholomew and Olin, 2006). A significant finding is that infection, including HIV/AIDS, constituted well over 10% with the lauer contributing 7%.This corroborates studies which rcponed a strong association between infection and cardiovascular dise::s.; (Lowe, 2001), and a higher prevalence of PYO in HIV infected populations (Olalla *et al.*. 2009). These findings imply that prudent control of infections including HIV/AIDS by use of antihiotics or antirctrovira l agents may mitigate the prevalence of PYO. rurthcr. they suggest that infection especially HIV, endemic in Kenya, should be considered an important dilTerential diagnosis in PVD.

The co-existence of well known cardiovascular risk factors with infectious conditions in aetiology of PVD in the study population supports the epidemiological trnnsition reponed in Sub-Sahar.m Africa in which non-communicable diseases are ovenaking communicable conditions as causes of morbidity in Africa (Mensah.2008).

Another notable implica1cd factor is the category of connective tissue disorders.Indeed vasculitis secondary to connective tissue disorders may involve vessels of any size with a predominance of small vessels (Doyle, 2006). Involvement of Cl"\lrol and smaller vessels in the current study is, therefore,concordant, and suggests that these disorders should always be considered differential diagnoses in cases of PVD. Prompt recognition and treatment of secondary vascuUtis in the patients can significantly mitigate morbidity and mortality due to PVD.

Radiotherapy was implicated in over 5% of cases, supponing reports that it causes arterial s1enosis (Risbroek *et al.* 2000). Compared to atherosclerosis, following treatment, mdiother:1py induced anerial PVD has increased risk of re-stcnosis, re-thrombosis and graft rejection. Accordingly. due diligence should be exercised in management of these cases. Moderate alcohol consumption appears to decrease risk of PVD in heahhy men (Camargo *et al.* 1997).

The apparent positive association found may be due to association with well known risk factors. The concurrence nf PVD with ischaemic heart and cerebrovaseular diseae is concordant with literature reports (C.olomb; Stefllten *et al.*• 2008). This suggests that there is need Lo screen for other vuso-occlusive conditions in cases of PVD for early detection in order lo curtail asociatcd morbidity and mortJtility.

Ageand gender distribution:

In Caucasian populations, PVD usually increases with age and mainly affects people in their *1•* or g• decades of life (Oatholomew and OUn, 2006). Observations of the current study reveal a mean age of 60.5years, nearly a decade earlier. further, over 30% of the individuals are below 50 years of age and can therefore be considered 10 h:ive developed premature atherosclerosis (Hansen *et ul.*. 1995) a stage of lhc condition hitheno known to uflcc1 only a minority of the Caucasian populations (Datholomew and Olin, 2006). The high prevalence of premature atherosclerosis may be attributed to early onset hypencnsion among Africans, smoking, familial tendency or infection (Valentine *et al.*. 2004). Pertinent observations of the current study are rhe high prevalence of smoking and infection. both of which occur among young individuals. and connective tissue disorders which tend to have a familial tendency. Indeed, smoking and family history act additively 10 increase risk of premature PVD (Valentine *et al.*, 2004). Another probable explanation for high prevalence of premature PVD may be ethnic variations intrinsic in the vessels. The prognosis for the majority of these patients is poor (Valentine *e, al.*,2004). This may explain the relatively high rutc of ampi.mniom and death observed in the present study. Early onset screening of at risk patients may mitigate this poor outcome.

Several studies rcpon a higher prevalence of PVD in females (Aboyans *et al.*. 2007). In the present study, there was a male predominance in nearly all age groups. This implicates risk factors such as smoking, and alcohol .;onsumption which are more indulged into by men, and suggests that loss of the protective effect of estrogen in post-menopausal women is not a prominent factor in PVD.

Conclusion:-

Peripheral vascular disease in the study population predominantly affects the fcmoropopliteal segment and is more common in males. It occurs a decade earlier than in Caucasian populations, and besides hypertension, diabetes mellitus and smoking, infectious conditions happen also to constitute a significant risk. Control of blood pressure, diabetes mellitus, reduction of smoking and prudent management of infections is recommended.

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