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Article *in* Pakistan Journal of Medical & Health Sciences · January 2018

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ORIGINAL ARTICLE

Prevalence of Peripheral Arterial Disease in End Stage Renal Disease Patients Undergoing Hemodialysis: A Cross-Sectional Study

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ABSTRACT

The chronic renal disease is a principle common medical dilemma in Iraq. Peripheral arterial disease (PAD) is a prevalent infirmity in the hemodialysis people. The aim of present study was to estimate the prevalence of PAD in subjects with end-stage renal disease (ESRD). This cross-sectional study was done between January 2016 and May 2017 on ESRD subjects regularly attending renal dialysis unit in Al-Kindy teaching hospital in Baghdad, Iraq. PAD was diagnosed on the base of the ankle-brachial index (ABI) measured by using a hand-held Doppler ultrasound. Subjects with ABI ≤0.9 were supposed positive for PAD. A total of 150 ESRD cases were analyzed. The mean age of the subject was 49.52±15 years. Majority of them were males 87(58%). Most of the subjects were hypertensive 100(66.6%), while 39(26%) were diabetic. PAD was present in 79(52.7%) of cases. Intermittent claudication was the main manifestation in patients with PAD 57(72.15%) and only 3(3.8%) of the patients end with an amputation. The study revealed that only older age was significantly and individually linked with PAD, while additional determinants such as male gender, smoking, positive virology, hypertension, diabetes mellitus, hyperlipidemia, and IHD were not significant. We conclude that PAD prevalence is high among subjects with ESRD undergoing hemodialysis. The ABI should be routinely calculated for subjects with ESRD on usual hemodialysis.
Keywords: PAD, ESRD, ABI, chronic kidney disease.

INTRODUCTION

Subjects with chronic kidney disease (CKD) undergoing hemodialysis have large degrees of lower limb atherosclerosis, where the prevalence of peripheral artery disease (PAD) fluctuates from 16.6 to 38.5%, opposed to 4.4 to 29% in the overall population[1,2]. Subjects with CKD are extremely predisposed to exhibiting hastened atherosclerosis, even in the lack of specific classical cardiovascular hazard factors. Oftentimes those subjects not only present traditional hazard factors such as hypertension, diabetes, or dyslipidemia, but also other non-traditional factors such as inflammation, malnutrition, and oxidative tension, which excite and expand atherosclerosis[3-6]. Although the association between myocardial infarction, stroke, and cardiovascular death with renal dysfunction is well authorized, there are few data on the prevalence of PAD in the lower extremities in subjects with CKD[7].

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The common characteristic manifestation of PAD is intermittent claudication. Rest pain, tissue loss, and gangrene are among the more extreme presentations of PAD and it has been a major cause of lower limb amputation, especially in those with diabetes[8].

Ankle-brachial index (ABI) is a noninvasive diagnostic test that is simple to do, relevant, and effective in identifying subclinical PAD. It has also been proved to be a powerful predictor of cardiovascular morbidity and death. An ABI<0.9 is 95% sensitive and 100% specific for angiographically diagnosed PAD for arterial stenosis≥50% in the lower limbs[9,10].

The immediate discovery of PAD recognizes a gathering of cases who would benefit from vigorous cardiovascular hazard factor correction and limit the unfavorable consequences such as pain rest pain, a danger of tissue necrosis, and also amputation of legs[7-9].

Many researchers have been investigated the prevalence of PAD in the hemodialysis people. Nevertheless, no before-mentioned work had been carried out in Iraq. So we achieved the present study with an aim to estimate the prevalence of PAD in end-stage renal disease (ESRD) subjects on hemodialysis from middle Baghdad.

PATIENTS AND METHODS

This hospital-based cross-sectional study was conducted at Hemodialysis Unit of Alkindy Teaching Hospital from January 2016 to May 2017, where 150 cases of hemodialysis subjects were prospectively investigated. Approval of the regional ethical and scientific boards was taken before study start. Consents were gathered from all subjects entered in this study. Data were assembled applying a questionnaire sheet and were filled by a close conversation with subjects. The systolic blood pressure (SBP) in the posterior tibial artery or dorsalis pedis artery was recorded and next divided by the SBP in the brachial artery from the upper limb to determine the ABI. ABI was measured by using a hand-held Doppler ultrasound with an appropriately sized sphygmomanometer cuff for each subject. Subjects with ABI ≤0.9 was regarded positive for PAD.

Data were inserted into the statistical package of social science (SPSS) program version 24 where descriptive statistics were presented in form of percentages and tables. For analytic statistics, Chi-square test was applied to determine if there was any relationship between ABI groups with specific data (age, gender, duration of dialysis, smoking, hypertension, diabetes mellitus, hyperlipidemia, virus, stroke and ischemic heart disease) where if P-value < 0.05 was regarded as an important association.

RESULTS

This study reveals that 58% (87) of subjects with ESRD were males, the mean age of the subjects was 49.52 ± 15, 39.3% (59) were smokers, 66.6% (100) were hypertensive, 26% (39) were diabetic, 33.3% (50) of the subjects had coronary artery disease and 13.3% (20) had cerebrovascular disease. The mean of SBP was 140.53 ± 30.2, the mean of diastolic blood pressure (DBP) was 77.6± 18 and the pulse pressure (PP) was 62.9± 27 (Table 1).

The results show that the PAD was diagnosed in 52.7% (79) of subjects, whose manifestations were mainly intermittent claudication 72.15% (57) and only 3.8% (3) of the cases end with an amputation.

The results show that the mean of ABI of subjects with PAD was 0.73± 0.13. The discrepancy in the rate of males in subjects with PAD and without PAD was not statistically important (P=0.952). The subject's mean age with PAD was higher significantly than those without PAD (P=0.038) (Table 2).

PAD prevalence was higher among subjects with a history of smoking, hypertension, diabetes mellitus, hyperlipidemia, positive virology, IHD, and stroke. But all these variables showed no significant association with PAD as summarized in Table 3.

Table 1. Social and morbidity data of the study sample (n=150)

Social/morbidity factor	n
Sex: males	87 (58)
Age: years	49.52 ± 15
Diabetes	39 (26)
Hypertension	100 (66.75)
Smoking	59 (39.3)
Coronary heart disease	50 (33.3)
Cerebrovascular disease	20 (13.3)
Hyperlipidemia	27 (18)
Positive virology	78 (52)
SBP mm Hg	140.53 ± 30.2
DBP mm Hg	77.6 ± 18
PP mm Hg	62.9 ± 27

Table 2: Demographic features of subjects with & without the diagnosis of PAD

Variable	**PAD Present (ABI ≤ 0.9) (n=79)**	**PAD Absent (ABI>0.9) (n=71)**	**P value**
Age (years)	51.9 ± 13.6	46.8 ± 16	0.038
Male	46(52.9%)	41(47.1%)	0.952

Table 3. Comparison of clinical aspects of subjects with and without the diagnosis of PAD

Variables	**PAD Present (ABI ≤ 0.9) (n=79)**	**PAD Absent (ABI > 0.9) (n=71)**	**P value**
Smoking	35(59.3%)	24(33.8%)	0.189
Positive virology	44(56.4%)	34(47.8%)	0.339
Diabetes mellitus	21(26.6%)	18(25.3%)	0.864
Hypertension	52(65.8%)	48(67.6%)	0.817
Hyperlipidemia	16(20.2%)	11(15.5%)	0.449
IHD	28(35.4%)	22(30.9%)	0.563
Stroke	10(12.6%)	10(14%)	0.798
Claudication	57(72.1%)	5(7%)	0.000
Amputation	3(3.8%)	1(1.4%)	0.365
SBP mm Hg	141.6 ± 29.1	139.3± 31.6	0.636
DBP mm Hg	77.8 ± 19.3	77.3 ± 16.6	0.860
PP mm Hg	63.8 ± 28.1	61.9 ± 25.9	0.681
Duration of dialysis (y)	2.12 ± 1.24	2.18 ± 1.99	0.863

DISCUSSION

Various worldwide studies had achieved including a varied prevalence of PAD in the hemodialysis people. However, the present research work is the primary of its sort in Iraq, to assess the prevalence of PAD in the hemodialysis subjects applying ABI. PAD serves a pointer to a poor prognosis in the hemodialysis subjects and may assist to distinguish a group at an extremely great danger that may profit from

advancing curative interference[11]. There have been very few studies investigating PAD risk factors among patients with ESRD[12]. The appearance of PAD really raises the chance of both morbidity (chronic ischemic ulceration, gangrene, and amputation) and mortality between ESRD subjects[13,14].

The present study showed that the PAD prevalence among ESRD subjects undergoing regular hemodialysis was 52.7%. O'Hare and Johansen[15] noted that PAD is more prevalent among subjects with ESRD than in the overall community. Prevalence rates vary from 17 to 48%, depending on the ESRD group analyzed and the distinguishing techniques employed. Lim et al[16] wrote that the most popular manifestation of PAD is intermittent claudication, and these findings are agreeing with this study since the intermittent claudication prevalence among PAD subjects was (72.15%) (57 out of 79). The results of this study revealed that PAD prevalence was significantly higher in subjects with intermittent claudication and in subjects with old age. PAD is often noted in old age subjects in overall community[17]. Yet, in hemodialysis subjects; also youngest can have a big prevalence of PAD due to uremia effects and dialysis-associated determinants. However, the present study revealed the prevalence of PAD remaining higher in elderly subjects. The cause for not seeing youthful subjects with PAD in this study may be attributed to that the bulk of our cases were of old age i.e. age > 40 years and held in hemodialysis for longer than a two-year continuation. The popular concept is that PAD is frequent in men in the general community[18-20]. The aforementioned concept was kept also in the present research. Though, the constant relationship of male sex with PAD in ESRD people is yet unexplained.

On the other hand, PAD prevalence was not differing significantly according to diabetes, hypertension, IHD, stroke, SBP, DBP, BP, hyperlipidemia, amputation, duration of the dialysis (year), the presence of the virus, and gender. Selvin et al[21] declared that the most conventional hazard determinants for atherosclerosis (e.g. old age, smoking, and diabetes mellitus) are well correlated with PAD, but the perception of determinants exactly leading to the evolution of PAD and its sequence in ESRD subjects is remained actually poor. These findings were in agreement with this study according to the age but different according to diabetes and smoking since there was no strong association between PAD and diabetes/smoking in the present study.

Lim et al[16] highlighted that PAD is a growing and frequent under-diagnosed health dilemma. Evaluation of the PAD prevalence is an essential concern for estimating health demands and organizing health settings.

CONCLUSION

Peripheral arterial disease prevalence is high among subjects with end-stage kidney disease sustaining hemodialysis. Patient's older age is a risk determinant for the peripheral arterial disease. The ankle-brachial index should be routinely estimated for subjects with end-stage kidney disease on usual hemodialysis.

Acknowledgments: We would desire to appreciate all occupants of the Department of Radiology and all the sufferers and treating teams of Nephrology Department who were instantly included in this work.

Funding source: none

Conflict of interest: The authors declare that they have no conflict of interest.

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