Available online at: http://www.iajps.com   *Research Article*

INCIDENCE OF ASYMPTOMATIC PERIPHERAL DISEASES IN METABOLIC SYNDROME AFFECTED PATIENTS

Dr Raana Shahid[1], Dr Tehrim Tahir[1], Dr Ayesha Ashraf[2]
[1] Fatima Jinnah Medical University, Lahore
[2] Rawalpindi Medical College, Rawalpindi

Abstract:
Aim: To determine the frequency of asymptomatic peripheral arterial disease (PAD) in patients with metabolic syndrome.
Study design: A descriptive case series study.
Place and Duration: In the Medicine department of Sir Ganga Ram Hospital, Lahore for one-year duration from February 2019 to February 2020.
Subjects: 110 patients with metabolic syndrome were selected for this study. The ankle-brachial index was calculated by measuring systolic blood pressure (using a Doppler probe) in the brachial arteries, posterior tibia and dorsal foot on both sides. The highest of the four ankle and foot measurements is divided by the highest of the two brachial measurements to reach ABI. The ankle-brachial cut-off value for diagnosing peripheral arterial disease was <0.90.
Results: The mean age of patients was 51.6 ± 8.9 years. 63 (57.3%) patients were men and 47 (42.7%) were women. There were 79 (71.8%) patients with a history of diabetes and 66 (60%) patients with a history of hypertension. The patients' average ankle and shoulder index was 0.95 ± 0.046. There were 14 (12.7%) patients with an ankle brachial index> 0.90. The distribution of peripheral arterial disease was 14 patients (12.7%) and 96 (87.7%) without PAD.
Conclusion: Metabolic syndrome is associated with an increased risk of vascular events in patients with peripheral arterial disease.
Key words: metabolic syndrome, peripheral artery disease (PAD), ankle-brachial index (ABI)

Corresponding author:
Dr. Raana Shahid,
Fatima Jinnah Medical University, Lahore

QR code

*Please cite this article in press Raana Shahid et al, **Incidence Of Asymptomatic Peripheral Diseases In Metabolic Syndrome Affected Patients.,** Indo Am. J. P. Sci, 2020; 07(06).*

INTRODUCTION:

Metabolic syndrome is central fat that is based on the waist circumference with two or more of four factors, including triglycerides, low HDL cholesterol, high blood pressure, and deglycation[1-2]. The incidence of metabolic syndrome in adults visiting the Agha Khan University (AKU) outpatient clinic in Karachi was 35.2%, 46% at Ziauddin3 University Hospital, and approximately 40% of American adults[3-4]. As indicated by low ankle brachial systolic pressure (ankle brachial index (ABI) <0.90), asymptomatic peripheral arterial disease is associated with the presence of diffuse thromboembolism and predicts the risk of cardiovascular death, myocardial infarction and stroke, so its measurement is known before It is useful to reclassify a significant proportion of non-patients at high risk. Peripheral arterial disease can be diagnosed non-invasively and reliably using the ankle-brachial joint index with the Doppler-recorded systolic pressure coefficient in the lower and upper limbs[5-6]. Edinburgh Arterial Study, Heart, Lung, and Blood Vessel Center Study, China confirmed ABI diagnostic efficacy in predicting atherosclerosis with 95% sensitivity and 99% specificity in diagnosing peripheral arterial disease[7-8]. The main components of the metabolic syndrome are body mass index, waist-to-hip ratio and waist circumference, atherogenic dyslipidemia (AD) and insulin resistance (IR). The ability to demonstrate asymptomatic peripheral arterial disease in the early stages of metabolic syndrome can change our daily clinical decision-making process in cases with metabolic syndrome.

Metabolic syndrome (International Diabetes Federation 2005): central lubrication with two or more of the following (defined as waist circumference for women> 90 cm, men> 80 cm):
1. Serum triglycerides:> 150 mg / dl or specific treatment for this lipid abnormality.
2. HDL cholesterol: <40 mg / dl in men and <50 mg / dl in women, or specific treatment for this lipid abnormality.
3. High blood pressure:> 130/85 mmHg or previously diagnosed treatment of hypertension.
4. Fasting plasma glucose:> 100 mg / dL or previously diagnosed with type 2 diabetes.
Type 2 diabetes mellitus previously diagnosed. 1 (Microlab 300 for the detection of serum triglycerides, serum HDL cholesterol and fasting plasma glucose, 12-14 hours fasting)

MATERIALS AND METHODS:

A descriptive case series study was conducted at the Medicine department of Sir Ganga Ram Hospital, Lahore for one-year duration from February 2019 to February 2020. In cases with metabolic syndrome, the sample size is 110, the incidence of asymptomatic peripheral arterial disease is 7.3%, the confidence interval is 95%, and the error margin is 5%. The study covered years or more with a metabolic syndrome consistent with the operational definition. Smokers with family history of hypertension, chronic kidney disease, heart liver disease, active coronary artery disease, solid and hematological malignancies, symptomatic peripheral arterial disease, and pregnancy were excluded. Informed consent was made to measure the ankle-brachial index. The patient's identity was confidential. The risks and benefits have been explained to the participants. All participants were interviewed to obtain demographic information and history of diabetes and hypertension. Impact regulators such as age, history of diabetes and hypertension were controlled by stratification. The ankle-brachial index was calculated by measuring systolic blood pressure (using a Doppler probe) in the brachial arteries, posterior tibia and dorsal foot on both sides. The highest of the four ankle and foot measurements is divided by the highest of the two arm measurements to reach ABI. The ankle-brachial cut-off value for diagnosis of peripheral arterial disease was <0.9. All data was collected in a previously designed form (attached). Data analyzed using SPSS 10.0

RESULTS:

The mean age of patients was 51.6 ± 8.9 years. 56 (50.9%) patients aged 40-50 years, 34 (30.9%) patients aged 51-60 years, 18 (16.4%) patients aged 61-70 years and 2 (1.8 %) of elderly patients have age range 71-80 years (Table 1). The gender distribution was 63 (57.3%) men and 47 (42.7%) women. There were 79 patients (71.8%) with a history of diabetes and 66 patients (60%) with a history of hypertension (Table 3). The mean systolic blood pressure in patients was 128.4 ± 16.0 mmHg (Table 4). The mean diastolic blood pressure of the patients was 80.1 ± 8.1 mmHg (Table 5). The mean right systolic shoulder pressure of patients was 126.0 ± 14.9 mmHg (Table 6). The mean left systolic blood of patients was 126.3 ± 15.3 mmHg (Table 7). Normal diastolic right and right dorsalis pedis systolic pressure was 118.1 ± 13.8 mmHg (Table 8). Normal patient systolic tibial blood pressure was 119.3 ± 13.3 mmHg (Table 9). The mean systolic dorsal pressure of the patients' left foot was 118.6 ± 13.2 mmHg (Table 10). The mean systolic blood pressure in the left posterior tibia of patients was 119.3 ± 13.2 mmHg (Table 11). The patients' average ankle and shoulder index was 0.95 ± 0.046. There were 14 (12.7%) patients with an ankle brachial index 0.90 (Table 12). The distribution of peripheral arterial disease included 14 patients with PAD (12.7%) and 96 patients without PAD (87.7%) (Table 13). Comparing PAD with age, 2 (1.9%) PAD patients between 40 and 50 years old, 7 (6.4%) PAD patients between 51 and 60 years old, 4 (3.6%) patients with PAD aged 61–70

and 1 (% 0.9), a patient with PAD is present at the age of 711–80 (Table 14). Comparing the history of PAD and diabetes, there were 13 (11.8%) PAD patients with a history of diabetes and 66 (60%) patients without PAD with a history of diabetes (Table 15). Compared to PAD with a history of hypertension, there were 10 (9.1%) patients with a history of PAD and 56 patients without PAD with a history of hypertension (Table 16).

Tab 1: Distribution of patients by age (n=110)

Age (Years)	=n	%age
40-50	56	50.9
51-60	34	30.9
61-70	18	16.4
71-80	2	1.8
Mean±SD	51.6±8.9	

Table 2: Distribution of patients by sex (n=110)

Gender	=n	%age
Male	63	57.3
Female	47	42.7
Total	110	100.0

Table 3: Distribution of patients by history(n=110)

	Diabetes mellitus	Hypertension
Yes	79(71.8%)	66(60%)
No	31(28.2%)	44(40%)

Table 4: Distribution of pts by systolic BP (n=110)

SBP (mmHg)	=n	%age
100-120	44	40.0
121-140	48	43.6
141-160	16	14.6
>160	2	1.8
Mean±SD	128.4±16.0	

Table 5: Distribution of patients by diastolic BP (n=110)

DBP (mmHg)	=n	%age
70-80	77	70.0
81-90	26	23.7
91-100	7	6.3
Mean±SD	80.1±8.1	

Table 6: Distribution of patients by right brachial systolic blood pressure (n=110)

RBSBP (mmHg)	=n	%age
Upto 100	3	2.7
101-120	41	37.3
121-140	48	43.6
141-160	18	16.4
Mean±SD	126.0±14.9	

Table 7: Distribution of pts by left brachial systolic BP

LBSBP (mmHg)	=n	%age
Upto 100	3	2.7
101-120	43	39.1
121-140	47	42.7
141-160	17	15.5
Mean±SD	126.3±15.3	

Table 8: Distribution of patients by right dorsalis pedis systolic blood pressure (n=110)

RDPSBP (mmHg)	=n	%age
Upto 100	5	4.5
101-120	62	56.4
121-140	37	33.6
141-160	6	5.5
Mean±SD	118.1±13.8	

Table 9: Distribution of patients by right posterior tibial systolic blood pressure (n=110)

RPTSBP (mmHg)	=n	%age
Upto 100	3	2.7
101-120	60	54.5
121-140	38	34.6
141-160	9	8.2
Mean±SD	119.3±13.3	

Table 10: Distribution of patients by left dorsalis pedis systolic blood pressure (n=110)

LDPSBP (mmHg)	=n	%age
Upto 100	3	2.7
101-120	60	54.5
121-140	40	36.4
141-160	7	6.4
Mean±SD	118.6±13.2	

Table 11: Distribution of patients by left posterior tibial systolic blood pressure (n=110)

LPTSBP (mmHg)	=n	%age
Upto 100	4	3.6
101-120	56	50.9
121-140	43	39.1
141-160	7	6.4
Mean±SD	119.3±13.2	

Table 12: Distribution of pts by ankle brachial index (n=110)

ABI	=n	%age
<0.90	14	12.7
≥0.90	96	87.3
Mean±SD	0.95±0.046	

Table 13: Distribution of patients by peripheral arterial disease

PAD	=n	%age
Present	14	12.7
Absent	96	87.3
Total	110	100.0

Table 14: Comparison of peripheral arterial disease with age

Age	Present	Absent
40-50	2(1.8%)	54(49.1%)
51-60	7(6.4%)	27(24.6%)
61-70	4(3.6%)	14(12.7%)
71-80	10(9%)	1(0.9%)
Total	14(12.7%)	96(87.3%)

Table 15: Comparison of peripheral arterial disease with history of diabetes mellitus (n=110)

History of diabetes mellitus	Present	Absent
Yes	13(11.8%)	66(60%)
No	1(0.9%)	30(27.3%)
Total	14(12.7%)	96(87.3%)

Table 16: Comparison of peripheral arterial disease with history of hypertension (n=110)

History of hypertension	Present	Absent
Yes	10(9.1%)	56(50.9%)
No	4(3.6%)	40(36.4%)
Total	14(12.7%)	96(87.3%)

DISCUSSION:

Peripheral arterial disease is a pronounced atherothrombotic syndrome manifested in narrowing and obstruction of the peripheral artery beds, usually in the lower extremities. Risk factors include smoking, hypertension, diabetes, hyperlipidemia and inactivity[9-10]. As indicated by a low index of systolic shoulder pressure (ITB <0.90), asymptomatic peripheral arterial disease is associated with the presence of diffuse thromboembolism4 and predicts the risk of cardiovascular death, myocardial infarction and stroke. therefore, its measurement is useful in reclassifying a significant proportion of patients without previously known thromboembolic disease as high risk. The incidence of vascular diseases in people with metabolic syndrome is much higher than in people without syndrome (29.4% vs. 9.6%). The low incidence of ITB (<0.90) in asymptomatic peripheral arterial disease is much higher in patients with metabolic syndrome than in those without metabolic syndrome (7.3 to 2.5%)[11]. In our study, the average age of patients was 51.6 ± 8.9 years. Achimastos et al. The average age of our patients was 45.3 ± 15.5, which can be compared with our study. Kim et al. In another study, the average age of patients was 58 ± 8, which can be compared with our study. In our study there were 57.3% men and 42.7% women[12]. Compared to the study of Lemogoum et al. there were 60% of male patients comparable to our study and 40% of women. In our study, the incidence of peripheral arterial disease in the metabolic syndrome was found in 12.7% of patients[13]. Criqui et al. The incidence of peripheral arterial disease in the metabolic syndrome was found in 11.7% of patients, which was almost identical and comparable to our study. Jahan et al. In another study by Agh Khan, the incidence of metabolic syndrome in adults admitted to an outpatient clinic at Karachi University was 35.2%. In our study, the incidence of peripheral arterial disease in the metabolic syndrome is 12.7% of patients. It is much higher than our previous occurrence study. Vasilios et al. In another study, the incidence of vascular disease was significantly higher in people with metabolic syndrome (29.4% vs. 9.6%). In our study, the incidence of peripheral arterial disease in the metabolic syndrome was 12.7% and was relatively low compared to the previous study[14]. The actual incidence of PAD in the population is generally unknown because patients with peripheral arterial disease may be asymptomatic or may have atypical symptoms or signs. 11.7% of the population had large vessel PAD in non-invasive tests, and almost half of those with large vessel PAD had small vessel PAD (5.2%). An additional 16.0% of the population had a small isolated PAD. Large vessel PAD increased dramatically with age and was slightly more common in men and patients with hyperlipidemia. In contrast, isolated PADs of the small vessel were not associated with gender, hyperlipidemia or age, but were less common before the age of 60. The frequency of intermittent claudication in this population was 2.2% in men and 1.7% in women, with irregularities observed in 20.3% of men and 22.1% of women[15]. 11.7% of the femur of the tibia or posterior compared to the PAD of a large vessel that was not invasively assessed. Therefore, assessing the incidence of large vessel PAD with intermittent claudication dramatically underestimated the true incidence of large vessel PAD, and assessing with peripheral pulse testing dramatically exaggerates the true incidence. Little is done in Pakistan about peripheral arterial disease with metabolic syndrome. My goal in this study is to discover the frequency of asymptomatic peripheral arterial disease with metabolic syndrome. Being able to demonstrate asymptomatic peripheral arterial disease in the early stages of metabolic syndrome, it can possibly be used as a surrogate marker in the prevention of cardiovascular and cerebrovascular diseases.

CONCLUSION:

Little studies are done in Pakistan about peripheral arterial disease with metabolic syndrome. My goal in this study is to discover the frequency of asymptomatic peripheral arterial disease with metabolic syndrome. Being able to demonstrate asymptomatic peripheral arterial disease in the early stages of metabolic syndrome, it can possibly be used as a surrogate marker in the prevention of cardiovascular and cerebrovascular diseases.

REFERENCES:

1. Smits, Loek P., Ruud S. Kootte, Evgeni Levin, Andrei Prodan, Susana Fuentes, Erwin G. Zoetendal, Zeneng Wang et al. "Effect of vegan fecal microbiota transplantation on carnitine- and choline-derived trimethylamine-N-oxide production and vascular inflammation in

patients with metabolic syndrome." *Journal of the American Heart Association* 7, no. 7 (2018): e008342.

2. Odum, Ehimen Phyllis, and Ekenechukwu Esther Young. "Elevated cardiac troponin I, creatine kinase and myoglobin and their relationship with cardiovascular risk factors in patients with type 2 diabetes." *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 12, no. 2 (2018): 141-145.

3. Sardu, Celestino, Raffaele Marfella, Matteo Santamaria, Stefano Papini, Quintino Parisi, Cosimo Sacra, Daniele Colaprete, Giuseppe Paolisso, Maria R. Rizzo, and Michelangela Barbieri. "Stretch, injury and inflammation markers evaluation to predict clinical outcomes after implantable cardioverter defibrillator therapy in heart failure patients with metabolic syndrome." *Frontiers in physiology* 9 (2018): 758.

4. Szentpetery, Agnes, Gerard M. Healy, Darragh Brady, Muhammad Haroon, Phil Gallagher, Ciaran E. Redmond, Hannah Fleming, John Duignan, Jonathan D. Dodd, and Oliver FitzGerald. "Higher coronary plaque burden in psoriatic arthritis is independent of metabolic syndrome and associated with underlying disease severity." *Arthritis & rheumatology* 70, no. 3 (2018): 396-407.

5. Barr, Karen P. "Electrodiagnosis in the Patient with Metabolic Syndrome: Adding Value to Patient Care." *Physical Medicine and Rehabilitation Clinics* 29, no. 4 (2018): 735-749.

6. Patti, Angelo Maria, Khalid Al-Rasadi, Rosaria Vincenza Giglio, Dragana Nikolic, Carlo Mannina, Giuseppa Castellino, Roberta Chianetta et al. "Natural approaches in metabolic syndrome management." *Archives of medical science: AMS* 14, no. 2 (2018): 422.

7. Tabrizi, Reza, Sina Vakili, Kamran B. Lankarani, Maryam Akbari, Mehri Jamilian, Zahra Mahdizadeh, Naghmeh Mirhosseini, and Zatollah Asemi. "The effects of vitamin D supplementation on markers related to endothelial function among patients with metabolic syndrome and related disorders: A systematic review and meta-analysis of clinical trials." *Hormone and Metabolic Research* 50, no. 08 (2018): 587-596.

8. Lambrinoudaki, Irene, Aikaterini Kazani, Eleni Armeni, Demetrios Rizos, Areti Augoulea, Georgios Kaparos, Andreas Alexandrou, Georgios Georgiopoulos, Ioannis Kanakakis, and Kimon Stamatelopoulos. "The metabolic syndrome is associated with carotid atherosclerosis and arterial stiffness in asymptomatic, nondiabetic postmenopausal women." *Gynecological Endocrinology* 34, no. 1 (2018): 78-82.

9. Tınazlı, Mehtap, Eda Becer, Nuriye Sancar, Yeşim Özgöl, and Levent Cerit. "Prevalence of Metabolic Syndrome in Routine Check-Up Program in Cyprus." *American Journal of Cardiology* 121, no. 8 (2018): e106.

10. Sulženko, Jakub, Piotr Paluszek, Roman Machnik, Petr Widimský, Jiří Jarkovský, and Piotr Pieniazek. "Prevalence and predictors of coronary artery disease in patients undergoing carotid artery stenting." *Coronary artery disease* 30, no. 3 (2019): 204-210.

11. Gargiulo, Paola, Fabio Marsico, Francesco Renga, Simona Dell'Aversana, Immacolata Esposito, Caterina Marciano, Santo Dellegrottaglie, Pasquale Perrone-Filardi, and Stefania Paolillo. "The metabolic syndrome in heart failure: insights to specific mechanisms." *Heart failure reviews* 25, no. 1 (2020): 1-7.

12. Kostic, Svetlana, Ivan Tasic, Dragan Djordjevic, Viktor Stoickov, and Nikola Stojanovic. "PREVALENCE OF METABOLIC SYNDROME IN PATIENTS WITH ARTERIAL HYPERTENSION AND ITS IMPACT ON ASYMPTOMATIC CAROTID ATHEROSCLEROSIS." *Facta Universitatis, Series: Medicine and Biology* (2019): 55-60.

13. Meryem, ABI-AYAD, Amine Abbou, Fatima zahra Abi-Ayad, Omar Behadada, and Mohamed Benyoucef. "HDL-C, ApoA1 and VLDL-TG as biomarkers for the carotid plaque presence in patients with metabolic syndrome." *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 12, no. 2 (2018): 175-179.

14. Adeva-Andany, María M., Raquel Funcasta-Calderón, Carlos Fernández-Fernández, Eva Ameneiros-Rodríguez, and Alberto Domínguez-Montero. "Subclinical vascular disease in patients with diabetes is associated with insulin resistance." *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* (2019).

15. Catharina, Arthur Santa, Rodrigo Modolo, Alessandra Mileni Versuti Ritter, Andréa Rodrigues Sabbatini, Heno Ferreira Lopes, Heitor Moreno Junior, and Ana Paula de Faria. "Metabolic syndrome-related features in controlled and resistant hypertensive subjects." *Arquivos brasileiros de cardiologia* 110, no. 6 (2018): 514-521.