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Original Research Article

Cardiovascular profile of vasculitis patients at tertiary care center

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ABSTRACT

Background: The vasculitides are a heterogenous group of conditions characterized by blood vessel inflammation and necrosis. Vasculitides are relatively uncommon conditions whose etiology is still poorly understood. Objective of the research was to study the cardiovascular profile of vasculitis patients at a tertiary care centre.
Methods: The present hospital based observational study was conducted in the department of internal medicine, Sher-i-Kashmir Institute of Medical Sciences (SKIMS), Srinagar, Jammu and Kashmir, India. The study had two parts: retrospective and prospective. In the retrospective part, all patients of vasculitis who were admitted or evaluated in outpatient department (OPD) from March 2012 to September 2018, were enrolled for the analysis. In the prospective part, all patients of vasculitis admitted or evaluated in OPD from October 2018 to May 2020 were enrolled for study.
Results: Out of total 77 patients studied, 39 (50.6%) were prospective cases and 38 (49.4%) cases were of retrospective nature. Normal echocardiographic and electrocardiography (ECG) findings were seen in majority of all three groups. Computed tomography (CT) angio shows involvement of right subclavian artery in 9 (40.9%) patients, 8 (36.4%) patients had involvement of left subclavian artery, 6 (27.3%) patients had involvement of arch of aorta, CT angio was suggestive of involvement left common carotid artery 5 patients, 2 patients each had involvement of celiac artery, bilateral iliac, ascending aorta, normal CT angio findings. Arterial Doppler was suggestive of involvement of right common carotid artery (CCA) and left CCA in 4 (30.8%) patients each, right superior cerebellar artery (SCA) involvement in 3 (23.1%) patients, left SCA involvement in 4 (30.8%) patients, left right brachiocephalic artery (RBA), right RA and B/L UA involvement was observed in 1 (7.7%) patient each.
Conclusions: The association between cardiovascular disease and a vasculitis is well documented. our study discusses the association between cv disease and vasculitis.

Keywords: CT angio, CCA, SCA, RBA

INTRODUCTION

The vasculitides are a heterogenous group of conditions characterized by blood vessel inflammation and necrosis.[1] Vasculitides are relatively uncommon conditions whose etiology is still poorly understood. Depending on the size, distribution and severity of the affected vessel, vasculitis can result in clinical syndromes that vary in severity from minor self-limiting rash to a life-threating multisystem disorder, recognizing the fact that some vasculitides can affect a wide variety of blood vessels. They are classified as primary or secondary and have their identifiable causes such as infectious agents, drug reactions, systemic autoimmune diseases or malignancy. Since it often begins with nonspecific symptoms and signs, unfolding slowly over weeks or months, vasculitis is one the great diagnostic challenges in all of medicine. Establishing the diagnosis of vasculitis requires lab tests, biopsy of affected vessel or angiogram in some cases or serological tests.

The 1994 International Chapel Hill consensus conference on the nomenclature of systemic vasculitides (CHCC 1994) proposed names and definitions for the most common forms of vasculitis.[1] This nomenclature was widely adopted. A second CHCC was held in 2012. The goals were to change names and definitions as appropriate, and add important categories of vasculitis not included in CHCC 1994. Classification of vasculitis and the main subcategories according to the 2012 CHCC nomenclature are given below.

Primary systemic vasculitis

Large-vessel vasculitis

In Takayasu arteritis, granulomatous aorto-arteritis are present usually occurring before age 50 years.

In giant-cell arteritis, granulomatous aorto-arteritis predominantly involving the carotid and vertebral arteries occurring after age 50 years are present and are often associated with polymyalgia rheumatica.

Medium vessel vasculitis

In poly-arteritis nodosa, arteritis of medium/small arteries without small vessel involvement, glomerulonephritis or antineutrophil cytoplasmic antibodies (ANCAs) are present.

In Kawasaki disease, childhood mucocutaneus lymph node syndrome with arteritis often involving coronary arteries is present.

Small-vessel vasculitis ANCA associated vasculitis include- microscopic polyangiitis: vasculitis of small/medium vessel and frequent pauci-immune glomerulonephritis and ANCAs; granulomatosis with polyangitis (Wegener's): granulomatous inflammation of the respiratory tract with vasculitis of small/medium vessels and frequent. Pauci-immune glomerulonephritis and ANCAs; and eosinophilic granulomatosis with polyangitis (Churg-Strauss): asthma, eosinophilia and eosinophilic granulomatous inflammation frequently involving the respiratory tract with vasculitis of small/medium vessels and sometimes ANCAs.

Immune-complex small vessel vasculitis

In antiglomerular basement membrane (anti GBM) disease cryoglobulinemic vasculitis, pulmonary and glomerular capillaritis occur with deposition anti-GBM antibodies. Vasculitis with frequent skin, glomerular and peripheral nerve involvement are associated with serum cryoglobulins.

In immunoglobulin (Ig) A vasculitis (Henoch-Schonlein), arthritis with frequent skin and gastrointestinal vasculitis occurs with IgA deposits and possible IgA neuropathy.

In hypocomplementemic urticarial vasculitis (anti-C1q vasculitis), urticarial hypocomplementic small vessel vasculitis occurs with anti C1 q antibodies and, articular, glomerular, ocular and bronchial disease.

Variable vessel vasculitis

In Behcet's disease, recurrent oral and/or genital ulcers with skin, ocular, articular, gastrointestinal, and/or central venous system lesions, and possible variable vessel vasculitis can be seen.

In Cogan's syndrome, vasculitis of small, medium or large arteries occurring in Cogan's syndrome can be observed.

Single organ vasculitis

It is vasculitis in a single organ and no features indicating a limited form of a systemic vasculitis. It can be subcategorized into: cutaneous leukocytoclastic angiitis, cutaneous arteritis, and primary central nervous system vasculitis isolated aortitis.

Vasculitis associated with systemic disease

It can be defined as vasculitis secondary to a systemic disease and it can be of the following types, lupus vasculitis, rheumatoid vasculitis, sarcoid vasculitis, and others (e.g. IgG4-related aortitis).

Vasculitis associated with probable cause

It can be defined as vasculitis secondary to specific cause. It can be subcategorized into: hepatitis C virus – associated cryoglobulinemic vasculitis, hepatitis B virus associated vasculitis; syphilis-associated aortitis, drug-associated immune complex vasculitis, drug associated ANCA-associated vasculitis; and others.

Aims and objective

The objective of the research was to study the cardiovascular profile of vasculitis patients at a tertiary care centre.

Table 1: Selected sets of classification criteria for the main vasculitis entities.

Vasculitis entity	Classification systems	Comments
Giant cell arteritis	ACR criteria[12]	Should be used in combination with vasculitis entry criteria
	Positive temporal artery biopsy (TAB)	No consensual histological definition for positive TAB, exclude by definition TAB negative disease

Continued.

Vasculitis entity	Classification systems	Comments
Takayasu arteritis	ACR criteria[13]	Should be used in combination with vasculitis entry criteria
	Published by Sharma et al[11]	Expert based criteria developed for pediatric populations. Should be used with vasculitis entry criteria
	EULAR/PRINTO/PRES[14]	
Polyarteritis nodosa PAN	CHCC definition[2,3]	Not intended as classification criteria
	ACR criteria[15]	Should be used in combination with vasculitis entry criteria. Low sensitivity and specificity
	FVSG criteria[10]	Should be used in combination with vasculitis entry criteria. Moderate sensitivity and specificity
	EMA algorithm[16]	Discriminates PAN from GPA
	EULAR/PRINTO/PRES[14]	Developed for pediatric populations. Should be used in combination with vasculitis entry criteria
Kawasaki disease granulomatosis with polyangitis (GPA), (Wegner's)	American Heart Association[7]	May not work well in adult populations
	ACR criteria[17]	Should be used in combination with vasculitis entry criteria
	Modified ACR criteria[8]	Alteration of the ACR criteria.[17] Should be used in combination with vasculitis entry criteria
	EMA algorithm[16]	Discriminates GPA from MPA, EGPA and PAN
	EULAR/PRINTO/PRES[14]	Developed for pediatric populations. Should be used in combination with vasculitis entry criteria
Microscopic polyangitis (MPA)	EMA algorithm[16]	Discriminates MPA from GPA, EGPA and PAN
Eosinophilic granulomatosis with polyangitis (EGPA), (Churg-Strauss)	ACR criteria[6]	Should be used in combination with vasculitis entry criteria. Discriminant ability from hypereosinophilic syndrome [HES] unclear
	Published by Lanhan et al[18]	Expert-based criteria. Discriminant ability from (HES) unclear
	EMA algorithm[16]	Discriminates EGPA from GPA, MPA and PAN. Discriminant ability from HES unclear
IgA vasculitis (Henoch-Schonlein)	ACR criteria[11]	May not work well in adult populations, should be used in combination with vasculitis entry criteria
	Published by Michael et al[19]	Discriminates IgA vasculitis from hypersensitivity vasculitis
	EULAR/PRINTO/PRES[14]	Developed for pediatric population. Should be used in combination with vasculitis entry criteria
Cryoglobulinemic vasculitis Behcet's disease	Published by de Vita et al[4]	Validation study published separately[20]
	ICBD[5]	More specific than the recently published ICBD criteria[5]
	1987 JBDRC criteria[21]	More sensitive than former ISG criteria[9] Expert based criteria. Predominantly used in the Asian content.

ACR: American College of Rheumatology; CHCC: Chapel Hill Consensus Conference; EMA: European Medicines Agency; EULAR/PRINTO/PRES: European League against Rheumatism/Paediatric Rheumatology International Trial Organization/Paediatric Rheumatology European Society; FVSG: French Vasculitis Study Group; ICBD: International criteria for Behcet's disease; ISG: International Study Group; JBDRC: Japanese Behcet's disease research committee

METHODS

The present hospital based observational study was conducted in the department of internal medicine, Sher-i-Kashmir Institute of Medical Sciences (SKIMS), Srinagar, Jammu and Kashmir, India.

The study had two parts: retrospective and prospective.

Retrospective part

All patients of vasculitis who were admitted or evaluated in outpatient department (OPD) from March 2012 to September 2018, were enrolled for the analysis.

Prospective part

All patients of vasculitis admitted or evaluated in OPD from October 2018 to May 2020 were enrolled for study.

Inclusion criteria

Patients with age >18 to 85 years, patients fulfilling American college of rheumatology (ACR)/European league against rheumatism (EULAR)/European medicines agency (EMA)/CHCC criteria and biopsy evidence of vasculitis, and patients who gave their consent were included in the study.

Exclusion criteria

Patients with age <18 years and >85 years, and patients who refused to give consent were excluded from the study.

Patients were classified as vasculitis if they fulfil ACR/EULAR/EMA/CHCC criteria for vasculitis and biopsy.

No major ethical issues are involved as the study does not involve any interventional experimentation, since it is purely an observational study. However, informed consent for confidentiality and permission for publishing the data was taken.

Statistical methods

The recorded data was compiled and entered in a spreadsheet (Microsoft excel) and then exported to data editor of statistical package for the social sciences (SPSS) version 20.0 (SPSS Inc., Chicago, Illinois, USA).

Continuous variables were expressed as mean±standard deviation (SD) and categorical variables were summarized as frequencies and percentages. Graphically the data was presented by bar and pie diagrams.

RESULTS

Our study was an observational study of 77 patients. The data was collected both prospectively 39 (50.6%) and retrospectively 38 (49.4%). Mean age of study patients was 40.9±15.72 years. Our study consisted of male 33 (42.9%), female 44 (57.1%). 62 (80.5%) belonged to rural areas where as 15 (19.5%) was from urban areas. In our study, large vessel vasculitis was present in 15 (19.48%) including Takayasu arthritis in 14 (93.33%) and giant cell arteritis in 1 (6.67%), medium vessel vasculitis was present in 3 (3.89%) including polyarteritis nodosa in 1 (33.37%) and superior mesenteric arteritis in 2 (66.66%), ANCA associated small vessel vasculitis was present in 27 (35.06%) including GPA in 22 (81.48%), EGPA in 4 (14.81%) and MPA in 1 (3.70%), immune complex small vessel vasculitis (IgA vasculitis) was seen in 2 (2.59%). Variable vessel vasculitis (Behcet's disease) was present in 6 (7.79%), single organ vasculitis was seen in 6 (7.79%) patients including cutaneous vasculitis in 4 (68.66%) and CNS vasculitis in 2 (33.34%).

Vasculitis associated with systemic disease was present in 4 (5.19%) patients including lupus vasculitis in 2 (50%) and rheumatoid vasculitis in 2 (50%) patients. Vasculitis associated with probable cause (NSAIDs induced vasculitis) was present in 1 (1.29%) patient. Biopsy evidence of vasculitis (not fulfilling criteria for other small vessel vasculitis) was present in 13 (16.88%).

Among all patients 21 (27.2%) were suffering from hypertension with 6 patients (27.5%) in large vessel vasculitis group (LVV), 11(27.5%) in small vessel vasculitis group (SVV) and 4 (18.18%) in other group.

Table 2: Distribution of study population.

Study population	No.	Percentage
Prospective cases	39	50.6
Retrospective cases	38	49.4
Total	77	100

Out of total 77 patients studied, 39 (50.6%) were prospective cases and 38 (49.4%) cases were of retrospective nature.

Patients were distributed in three groups viz. LVV, SVV and others. There were 9 (60%) prospective cases and 6 (40%) retrospective cases in LVV group, 22 (55%) prospective cases and 18 (45%) retrospective cases in SVV group while as 8 (36.4%) prospective and 14 (63.6%) retrospective cases constitute others group.

Table 3: Age distribution of study patients.

Age (years)	No.	Percentage
≤30	23	29.9
31-40	19	24.7
41-50	14	18.2
51-60	12	15.6
61-70	9	11.7
Total	77	100

Mean±SD (range)=40.9±15.72 (18-76)

The age of participants of the study ranged between 18-76 years with a mean age of 40.9±15.72 years.

When groups were distributed as per the age, it was observed that majority of patients i.e. 5 (33.33%) each in LVV group belonged to age groups of ≤30 and 31-40 years. In SVV group, majority of patients i.e. 11 (27.5%) belonged to age group of ≤30 years followed by 9 (22.5%) patients each who aged between 31-40 years and 41-50 years. There were 7 (31.80%) patients in other group who aged ≤30 years followed by 5 (22.72%) patients who belonged to the age group of 41-50 year.

There was a little female predominance in our study with 44 (57.1%) females and 33 (42.9%) males.

Table 4: Gender distribution of study patients.

Gender	LVV		SVV		Others	
	No.	%	No.	%	No.	%
Male	12	80.0	8	20.0	13	59.0
Female	3	20.0	32	80.0	9	41.0
Total	15	100	40	100	22	100

When groups were distributed as per the gender, it was observed that in group LVV there were 12 (80%) males compared to 3 (20%) females. In group SVV, there were 8

(20%) males compared to 32 (80%) females while as 13 (59%) males and 9 (41%) females constituted others group.

Clinically at presentation 5 (6.5%) patients presented as hypertensive with 2 (13.3%) in LVV group 3(7.5%) in SVV group and none in other group, accelerated hypertension in 2 (2.6%) patients all in LVV group, syncope in 1 (1.3%) patient, palpitation in 2 (2.6%).

On ECG normal sinus rhythm was seen in 65 (84.4%) patients, 9 (11.7%) patients had tachycardia, 1 (1.3%) each patient had LVH, RBBB and ventricular bigeminy.

Table 5: ECG findings of study patients.

ECG findings	LVV		SVV		Others	
	No.	%	No.	%	No.	%
NSR	10	66.66	39	97.5	16	72.72
Tachycardia	2	13.22	1	2.5	6	27.27
LVH	1	6.66	0	0.0	0	0
RBBB	1	6.66	0	0.0	0	0
Ventricular bigeminy	1	6.66	0	0.0	0	0
Total	15	100	40	100	22	100

On ECG, NSR was seen in 10 (66.66%) patients in LVV group, 39 (97.5%) patients in SVV group and 16 (72.72%) patients in others group. Tachycardia was seen in 2 (13.22%) patients in LVV group, 1 (2.5%) patient in SVV group and 6 (27.7%) in another group. LVH in 1 (6.66%) patient, RBBB in 1 (6.66%), ventricular bigeminy in 1 (6.66%) patient in LVV group.

Echocardiography was suggestive of MR in 4 (8%) patients, AV sclerosis, TR and PAH were found in 3 (6%) patients each. Normal echocardiographic findings were seen in 42 (84%) patients.

Table 6: Findings on echocardiography in study patients.

Findings	LVV		SVV		Others	
	No.	%	No.	%	No.	%
Normal	14	93.33	24	82.8	3	60
AV sclerosis	0	0.0	2	6.9	1	20
MR	0	0.0	3	10.3	1	20
TR	0	0.0	3	10.3	0	0
PAH	1	6.66	2	6.9	0	0

On echocardiography, 14 (93.33%) patients in LVV group, 24 (82.8%) and 3 (60%) patients had normal findings. AV sclerosis was seen in 2 (6.9%) patients in SVV group and 1 (20%) patient in others group. MR was seen in 3 (10.3%) patients in SVV group and 1 (20%) in others group. TR in 3 (10.3%) patients in SVV group. 1 (6.66%) patient in LVV group and 2 (6.9%) patients in SVV group had PAH on ECHO.

CT angio shows involvement of right subclavian artery in 9 (40.9%) patients, 8 (36.4%) patients had involvement of left subclavian artery, 6 (27.3%) patients had involvement of arch of aorta, CT angio was suggestive of left common carotid artery 5 patients, 2 patients each had involvement of celiac artery, bilateral iliac, ascending aorta, normal CT angio findings (Table 6).

Table 7 shows CT angio findings in three study groups with majority of findings in LVV group as compared to other groups.

Table 7: CT angio findings of study patients.

Stenosis/wall thickening	No.	%
Normal	2	9.1
Ascending aorta	2	9.1
Arch of aorta	6	27.3
Descending aorta	2	9.1
Abdomenal aorta	5	22.7
Right brachiocephalic artery	4	18.2
Right subclavian artery	9	40.9
Right common carotid artery	3	13.6
Left common carotid artery	5	22.7
Left subclavian artery	8	36.4
Right renal artery	1	4.5
Inferior mesenteric artery	1	4.5
Vertebral artery	1	4.5
SMA	4	18.2
Celiac artery	2	9.1
B/L iliac	2	9.1
Left ACA aneurysm	1	4.5
Digital subtraction angiography paucity of small vessels	1	4.5
Abdomen atherosclerotic disease	1	4.5
Left renal artery 4 mm aneurysm	1	4.5

Arterial Doppler was suggestive of involvement of right CCA and left CCA in 4 (30.8%) patients each, right SCA involvement in 3 (23.1%) patients, left SCA involvement in 4 (30.8%) patients, left RBA, right RA and B/L UA involvement was observed in 1 (7.7%) patient each.

Normal arterial Doppler was seen in all the 6 patients in SVV group. 1 patient in others group had bilateral involvement of UA. In LVV group, 4 (66.7%) patients each had involvement of right CCA and left CCA was involved in 3 (50%) patients, right SCA was involved in 1 (16.7%) each patient had involvement of left BA and right RA.

Final diagnosis was GPA in 22 (28.6%) patients, TA in 14 (18.2%) patients, biopsy evidence of SVV in 13 (16.88%) patients, Behcets disease in 6 (7.8%) patients, cutaneous vasculitis in 4 (5.1%) patients, EGPA in 4 (5.1%) patients.

Two patients each were diagnosed as IgA vasculitis, lupus vasculitis and CNS vasculitis. PAN, GCA and NSAID

induced vasculitis were the diagnosis of 1 (1.3%) patient each.

Table 8: CT angio findings of study patients.

Stenosis/wall thickening	LVV		SVV		Others	
	No.	%	No.	%	No.	%
Normal	0	0.0	1	20.0	1	100
Ascending aorta	2	12.5	0	0.0	0	0
Arch of aorta	6	37.5	0	0.0	0	0
Descending aorta	2	12.5	0	0.0	0	0
Abdomenal aorta	5	31.3	0	0.0	0	0
Right brachio-cephalic artery	3	18.8	1	20.0	0	0
Right subclavian artery	9	56.3	0	0.0	0	0
Right common carotid artery	3	18.8	0	0.0	0	0
Left common carotid artery	5	31.3	0	0.0	0	0
Left subclavian artery	8	50.0	0	0.0	0	0
Right renal artery	1	6.3	0	0.0	0	0
Inferior mesenteric artery	1	6.3	0	0.0	0	0
Vertebral artery	1	6.3	0	0.0	0	0
SMA	4	25.0	0	0.0	0	0
Celiac artery	2	12.5	0	0.0	0	0
B/L iliac	2	12.5	0	0.0	0	0
Left ACA aneurysm	0	0.0	1	20.0	0	0
Digital subtraction angiography paucity of small vessels	0	0.0	1	20.0	0	0
Abdomen atheros-clerotic disease	0	0.0	1	20.0	0	0
Left renal artery 4 mm aneurysm	0	0.0	1	20.0	0	0

Table 9: Arterial Doppler findings of study patients.

Arterial stenosis/ wall thickening	LVV		SVV		Others	
	No.	%	No.	%	No.	%
Normal	0	0.0	6	100	0	0
Right CCA	4	66.7	0	0.0	0	0
Left CCA	4	66.7	0	0.0	0	0
Right SCA	3	50.0	0	0.0	0	0
Left SCA	4	66.7	0	0.0	0	0
Left BA	1	16.7	0	0.0	0	0
Right RA	1	16.7	0	0.0	0	0
B/L UA	0	0.0	0	0.0	1	100

Table 10: Final diagnosis of study patients.

Diagnosis	No.	%
TA	14	18.2
GPA	22	28.6
EGPA	4	5.2
MPA	1	1.3
Behcets disease	6	7.8
Ig A Vasculitis	2	2.6
NSAID induced vasculitis	1	1.3
Lupus vasculitis	2	2.6
SLE with SVV	1	1.3
Cutaneous vasculitis	3	3.9
SLE with cutaneous vasculitis	1	1.3
CNS vasculitis	2	2.6
Rheumatoid vasculitis	1	1.3
RV with intersitial pheumonia	1	1.3
GCA	1	1.3
Isolated SMA vasculitis	1	1.3
SVV	10	13.0
PAN with ILD	1	1.3
SVV with IgA nephropathy	1	1.3
SLE with SMA vasculitis	1	1.3
UCTD with SVV	1	1.3
Total	77	100

DISCUSSION

Out of total 77 patients studied, 39 (50.6%) were prospective cases and 38 (49.4%) cases were of retrospective nature. There were 9 (60%) prospective cases and 6 (40%) retrospective cases in LVV group, 22 (55%) prospective cases and 18 (45%) retrospective cases in SVV group while as 8 (36.4%) prospective and 14 (63.6%) retrospective cases constitute others group. Majority of patients i.e. 5 (33.33%) each in LVV group belonged to age groups of ≤30 and 31-40 years. In SVV group, majority of patients i.e. 11 (27.5%) belonged to age group of≤30 years followed by 9 (22.5%) patients each who aged between 31-40 years and 41-50 years. In group LVV there were 12 (80%) males compared to 3 (20%) females. In group SVV, there were 8 (20%) males compared to 32 (80%) females while as 13 (59%) males and 9 (41%) females constituted others group. On ECG normal sinus rhythm was seen in 65 (84.4%) patients, 9 (11.7%) patients had tachycardia, 1 (1.3%) each patient had LVH, RBBB and ventricular bigeminy. On ECG, NSR was seen in 10 (66.66%) patients in LVV group, 39 (97.5%) patients in SVV group and 16 (72.72%) patients in others group. Tachycardia was seen in 2 (13.22%) patients in LVV group, 1 (2.5%) patient. Echocardiography was suggestive of MR in 4 (8%) patients, AV sclerosis, TR and PAH were found in 3 (6%) patients each. Normal echocardiographic findings were seen in 42 (84%) patients. On echocardiography, 14 (93.33%) patients in LVV group, 24 (82.8%) and 3 (60%) patients had normal findings. AV sclerosis was seen in 2 (6.9%) patients in SVV group and 1 (20%) patient in others group. MR was seen in 3 (10.3%)

patients in SVV group and 1 (20%) in others group. TR in 3 (10.3%) patients in SVV group. 1 (6.66%) patient in LVV group and 2 (6.9%) patients in SVV group had PAH on ECHO. Similar to our study, Nooshin et al conducted a study in which chest X-ray was normal in 13 (86.7%) patients, cardiomegaly was seen in 2 (13.3%) patients.[22] Echocardiography revealed aortic regurgitation in 11 patients (73.3%). On ECG normal sinus rhythm was observed was observed in all the 15 (100%) patients in their study and LVH was seen in 4 (26.6%) patients. CT angio shows involvement of right subclavian artery in 9 (40.9%) patients, 8 (36.4%) patients had involvement of left subclavian artery, 6 (27.3%) patients had involvement of arch of aorta, CT angio was suggestive of left common carotid artery 5 patients, 2 patients each had involvement of celiac artery, bilateral iliac, ascending aorta, normal CT angio findings. When compared in three study groups, majority of findings were in LVV group as compared to other groups.

Nooshin et al conducted a study in which coronary angiography was performed because of cardiac symptoms.[22] One patient was a 22-year-old male smoker and the other four were females without coronary risk factors (excluding hypertension), all of which were under the age of 50. Sharma et al conducted a study on clinical profile of Takayasu's arteritis and on CT angiography renal arteries were found in 23 (76.6%) patients, Coelic and superior mesenteric artery in 14 (46.6%) patients, right common carotid artery in 9 (30%) patients, left subclavian artery in 5 (16.6%) patients and right subclavian artery in 4 (13.3%).[23] The results of the above studies confirm the observations made in the present study. Arterial Doppler was suggestive of involvement of right CCA and left CCA in 4 (30.8%) patients each, right SCA involvement in 3 (23.1%) patients, left SCA involvement in 4 (30.8%) patients, left RBA, right RA and B/L UA involvement was observed in 1 (7.7%) patient each. Normal arterial Doppler was seen in all the 6 patients in SVV group. 1 patient in others group had bilateral involvement of UA. In LVV group, 4 (66.7%) patients each had involvement of right CCA and left CCA was involved in 3 (50%) patients, right SCA was involved in 1 (16.7%) each patient had involvement of left BA and right RA.

Limitations

This study is first of its kind in our Institute and the data was not found in which all the parameters we discussed are available. The sample size was small and the sample was recruited from a tertiary care center; hence, the findings could not be generalized to other treatment settings.

CONCLUSION

The association between cardiovascular disease and a vasculitis is well documented. The recent work by Massicotte-Azarniouch et al confirms the risk and adds to the existing evidence by describing the highest risk in the first 3 months after diagnosis. In this review, we aim to put involvement of CV system in vasculitis patients. We discussed increased CV disease in vasculitis patients due to inflammatory-driven endothelial dysfunction and platelet activation. These features alongside the impact of disease activity and systemic inflammation provide potential explanations to why the incidence of CV increase in vasculitis patients. We suggest future avenues of research, provide some suggestions to address and treat CV risk based on current evidence, and highlight the importance of addressing this topic early on. Addressing modifiable risk factors, dialogue with patients, patient information and a structured approach overall will be key to improve CV outcomes in vasculitis patients.

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