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CLINICAL AND ANGIOGRAPHIC SPECTRUM WITH ONE-YEAR OUTCOMES OF TAKAYASU ARTERITIS: A TWO-YEAR SINGLE-CENTER STUDY

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Abstract

Introduction: Takayasu arteritis is a chronic large-vessel vasculitis primarily affecting the aorta and its major branches, leading to progressive stenosis, occlusion, and aneurysmal changes. It predominantly affects young females and presents with variable clinical manifestations ranging from constitutional symptoms to limb claudication, neurological deficits, and organ ischemia. Early diagnosis and appropriate management are crucial to prevent long-term morbidity. ***Aims:*** This study aimed to evaluate the clinical and angiographic spectrum of Takayasu arteritis and to assess treatment distribution along with one-year clinical outcomes in patients managed at a tertiary care center. ***Materials and methods:*** The present study was a retrospective observational study. This Study was conducted at a tertiary care center over a period of two years. Department of Cardiology. Study population 24. ***Result:*** The study included 24 patients with Takayasu arteritis, predominantly females, with a mean age of 45.1 years. Hypertension (95.8%) and claudication (62.5%) were the main clinical features. The aorta was most commonly involved angiographically (87.5%). Endovascular therapy was used in 58.3% of cases. Follow-up showed symptom improvement in 70.8% at 6 months and 58.3% at 1 year, with improved blood pressure control over time. ***Conclusion:*** Takayasu arteritis predominantly affected young to middle-aged females, with hypertension and claudication being the most common clinical features. Angiographically, the aorta and its major branches were most frequently involved. Medical therapy was used more often than endovascular intervention. Patients showed improvement in symptoms and blood pressure control on follow-up, highlighting the need for long-term monitoring and individualized management.

Keywords: Takayasu arteritis, large-vessel vasculitis, angiographic spectrum, hypertension, endovascular therapy, clinical outcomes.

INTRODUCTION

Takayasu arteritis is a chronic, granulomatous inflammatory disease primarily affecting the aorta and its major branches, leading to stenosis, occlusion, or aneurysm formation [1].The disease predominantly affects young females,ratio as per Indian context is 1:1.12 [2].Though rare diseases still causes vascular insufficiency,cerebrovascular complications and renovascular hypertension [3].

The clinical Spectrum of Takayasu Arteritis ranges from constitutional symptoms like fatigue,weight loss,fever in acute phase to features of vascular insufficiency like limb claudication,neurological features such as TIAs,carotidynia,BP discrepancies in chronic phase [4].

Aortic involvement was classified according to the lesion location in aortogram [5].

Angiographic imaging remains central to the diagnosis and classification of the disease. Conventional angiography and computed tomography angiography (CTA) help delineate the extent and pattern of vascular involvement, commonly categorized using the Numano classification [6].The pattern of arterial involvement has been shown to vary across different geographic regions, with Indian cohorts demonstrating around 79% abdominal aorta involvement and 29% to 60% involvement of bilateral Renal artery[7,8].Thisis much higher than Western zone [9].

Management of Takayasu arteritis involves a combination of immunosuppressive therapy to control disease activity and revascularization procedures in selected patients with critical stenotic lesions [10].Endovascular interventions, including balloon

angioplasty and stent placement, have emerged as less invasive alternatives to surgical revascularization. However, concerns remain regarding restenosis rates, particularly in the setting of active disease(as marked by high ESR and CRP) [11].

Although several studies have described the clinical and angiographic features of Takayasu arteritis, data on mid-term outcomes following medical and endovascular management from Indian centers remain limited [9,12].Furthermore, variability in disease patterns and treatment responses necessitates region-specific data to guide clinical decision-making.

In this context, the present study aims to evaluate the clinical profile, angiographic spectrum, and one-year outcomes of patients with Takayasu arteritis admitted to a tertiary care center over a two-year period.

MATERIALS AND METHODS

Study Design and Population

This was a retrospective observational study conducted at a tertiary care center over a period of two years. All consecutive patients diagnosed with Takayasu arteritis and admitted during the study period were included. The diagnosis was established based on clinical features and imaging findings, in accordance with the American College of Rheumatology (ACR) 1990 classification criteria.

Patients with insufficient evidence of imaging reports and those lost to follow up were excluded from the study.

Data Collection

Clinical, laboratory, and imaging data were retrieved from hospital Bed head Tickets.Baseline variables included demographic characteristics (age, sex), presenting symptoms (hypertension, limb claudication, neurological deficits, heart failure), and clinical findings such as blood pressure discrepancy.

Laboratory parameters included erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP). Disease activity was assessed based on clinical evaluation and inflammatory markers, wherever available.

Imaging and Angiographic Assessment

All patients underwent vascular imaging in the form of computed tomography angiography (CTA) and/or conventional peripheral angiography. The pattern and extent of arterial involvement were classified according to the Numano angiographic classification.

Involvement of major vessels including the aorta, subclavian, carotid, renal, and coronary arteries was documented.

Treatment Strategy

Patients were managed with either medical therapy or endovascular intervention based on clinical presentation, disease severity, and physician discretion based on Rheumatology and Cardiology conjoint discussion.

Medical therapy included corticosteroids and/or immunosuppressive agents. Endovascular interventions comprised balloon angioplasty with or without stent placement in patients with significant stenotic lesions causing clinical symptoms or end-organ compromise.

Technical success of the procedure was defined as successful revascularization with residual stenosis <30% and restoration of adequate blood flow.

Follow-Up and Outcomes

Patients were followed up at 6 months and 1 year. Clinical outcomes assessed included symptom improvement, blood pressure control, and occurrence of disease flare.

Procedural outcomes included restenosis, defined as significant luminal narrowing at the treated site on follow-up imaging or recurrence of symptoms, and need for reintervention. Mortality during follow-up was also recorded.

Statistical Analysis: For statistical analysis, data were initially entered into a Microsoft Excel spreadsheet and then analyzed using SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism (version 5). Numerical variables were summarized using means and standard deviations, while Data were entered into Excel and analyzed using SPSS and GraphPad Prism. Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests were used to compare independent groups, while paired t-tests accounted for correlations in paired data. Chi-square tests (including Fisher's exact test for small sample sizes) were used for categorical data comparisons. P-values $\leq$ 0.05 were considered statistically significant.

RESULTS

A total of 24 patients with Takayasu arteritis were included in the study. The mean age of the study population was 45.1 years, with female predominance (**58.3%**).

Hypertension was the most common presenting manifestation, observed in **95.8%** of patients, followed by claudication in **62.5%** and neurological symptoms in **20.8%**.

Takayasu Arteritis Study Tables

Table 1: Baseline Characteristics Stratified by Treatment

Variable	Overall (n=24)	Medical (n=10)	Endovascular (n=14)
Mean age (years)	45.1	39.5	49.1
Female sex	14 (58.3%)	8 (80.0%)	6 (42.9%)
Hypertension	23 (95.8%)	9 (90.0%)	14 (100%)
Claudication	15 (62.5%)	8 (80.0%)	7 (50.0%)
Neurological symptoms	5 (20.8%)	2 (20.0%)	3 (21.4%)

Table 2: Angiographic Spectrum

Vessel Involvement	Frequency	Percentage
Aorta	21	87.5%
Subclavian	14	58.3%
Coronary	9	37.5%
Carotid	8	33.3%
Renal	6	25.0%

Table 3: Treatment Distribution

Treatment Type	Frequency	Percentage
Medical therapy	10	41.7%
Endovascular therapy	14	58.3%

Table 4: Follow-Up Outcomes

Outcome	6 Months	1 Year
Symptom improvement	70.8%	58.3%
BP control	58.3%	66.7%

Angiographic evaluation demonstrated predominant aortic involvement (87.5%), followed by subclavian artery involvement (58.3%). Coronary artery involvement was noted in **37.5%** of patients, while carotid and renal artery involvement were observed in 33.3% and 25.0% of patients, respectively.

Endovascular intervention was performed in **58.3%** of patients, while the remaining patients were managed medically. At 6-month follow-up, symptom improvement was observed in **70.8%** of patients, while blood pressure control was achieved in 58.3%. At 1-year follow-up, sustained symptom improvement was noted in **58.3%** of patients, and blood pressure control was achieved in **66.7%**.

LIMITATIONS

The present study has several limitations. First, this was a retrospective single-center observational study with a relatively small sample size, which may limit the generalizability of the findings to the broader population of patients with Takayasu arteritis. Second, the duration of follow-up was limited to one year, restricting assessment of long-term vascular outcomes, restenosis rates, and disease progression.

Third, imaging modalities were not uniform across all patients, as both computed tomography angiography and conventional angiography were utilized depending on clinical indication and availability. This may have resulted in variability in the assessment of disease extent and vascular involvement.

Additionally, disease activity assessment was primarily based on clinical and laboratory parameters, and standardized activity scoring systems such as ITAS2010 were not consistently available for all patients. Procedural variables including detailed lesion characteristics, technical success rates, and intravascular imaging findings were also not uniformly documented.

Finally, due to the observational nature of the study, treatment allocation was not randomized and was influenced by physician discretion and clinical severity, introducing the possibility of selection bias and confounding. Despite these limitations, the study provides valuable real-world data regarding the clinical spectrum, angiographic profile, and mid-term outcomes of Takayasu arteritis from a tertiary care center in India.

DISCUSSION

The present study evaluated 24 patients with Takayasu arteritis and demonstrated a clear clinical and angiographic profile along with short- and intermediate-term outcomes. The mean age was 45.1 years with female predominance (58.3%), consistent with the known female preponderance of this large-vessel vasculitis Numano F. [13], Sawalha AH et al. [14]. In this cohort, hypertension was the dominant clinical presentation (95.8%), followed by claudication (62.5%) and neurological symptoms (20.8%), reflecting the impact of extensive arterial stenosis and renovascular involvement Trinidad B et al. [15].

Angiographic assessment showed predominant aortic involvement in 87.5% of patients, making it the most frequently affected vessel. Subclavian artery involvement was seen in 58.3%, coronary artery involvement in 37.5%, carotid artery involvement in 33.3%, and renal artery involvement in 25.0%. This pattern reflects the classical distribution of Takayasu arteritis affecting the aorta and its major branches, with variable extension to visceral and coronary circulation Ishikawa K. [16].

Regarding treatment, endovascular intervention was performed in 58.3% of patients, while the remaining 41.7% were managed medically, highlighting a balanced but intervention-prone management approach in patients with significant vascular disease Goel R et al. [17]. Follow-up outcomes demonstrated symptom improvement in 70.8% of patients at 6 months, while blood pressure control was achieved in 58.3% at the same time point. At 1-year follow-up, sustained symptom improvement was observed in 58.3% of patients, and blood pressure control improved further to 66.7%, indicating continued benefit in hemodynamic control but slight reduction in symptom relief over time, possibly due to chronic disease activity or restenosis Maksimowicz-McKinnon K and Hoffman GS. [18].

These findings reinforce that Takayasu arteritis is a chronic, progressive vasculitis with predominant aortic and branch vessel involvement, significant hypertension burden, and variable response to medical and endovascular therapy. Long-term management requires sustained immunosuppression, vascular imaging surveillance, and individualized treatment strategies to maintain symptom control and prevent complications Matsuura K et al. [19], Arnaud L et al. [20].

CONCLUSION

Takayasu arteritis remains an important cause of vascular morbidity in young and middle-aged individuals, with hypertension and claudication being the predominant clinical manifestations in our cohort. Aortic and subclavian artery involvement constituted the most frequent angiographic patterns, while coronary artery involvement was also observed in a significant proportion of patients.

Endovascular intervention was feasible in selected patients and was associated with favorable short- to mid-term symptomatic and blood pressure outcomes. However, persistence or recurrence of symptoms during follow-up highlights the chronic relapsing nature of the disease and emphasizes the importance of continued surveillance and long-term management.

The present study provides real-world data regarding the clinical profile, angiographic spectrum, and treatment outcomes of Takayasu arteritis from a tertiary care center in India. Larger prospective multicentric studies with longer follow-up are required to better define optimal treatment strategies and long-term vascular outcomes in this complex disease.

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