

Endovascular Revascularization of Symptomatic Subclavian Artery Stenosis: Clinical Outcomes and Lessons Learned

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DOI: <https://doi.org/10.36348/sjm.2024.v09i12.005>

Received: 16.11.2024 | Accepted: 20.12.2024 | Published: 24.12.2024

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Abstract

Objectives: To analyze the clinical characteristics, management approaches, and outcomes of revascularization for symptomatic subclavian artery stenosis in 6 patients treated at the vascular surgery department of Moulay Ismail Military Hospital in Meknes between December 2021 and December 2024. **Methods:** A retrospective study was conducted on 6 patients who underwent percutaneous transluminal angioplasty (PTA) with or without stent placement. Clinical, radiological, and procedural data were collected and analyzed. **Results:** All patients had cardiovascular risk factors. Technical success was achieved in all patients with an average stenosis reduction of 87%. Complete symptom resolution was observed in 80% of patients. Minor complications, including hematoma at the puncture site, were reported in 1 case. **Conclusion:** PTA with or without stenting is a safe and effective treatment option for symptomatic subclavian artery stenosis, providing significant clinical improvement.

Keywords: Subclavian Artery Stenosis, Atherosclerosis, Subclavian Steal Syndrome, Angioplasty, Stenting.

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INTRODUCTION

Subclavian artery stenosis is a clinically significant vascular condition, often resulting from atherosclerosis. It can lead to symptoms such as upper limb claudication, subclavian steal syndrome, and dizziness, particularly in patients with coronary artery bypass grafts utilizing the internal mammary artery. These symptoms are exacerbated by reduced perfusion and can severely impact quality of life [1, 2].

Percutaneous transluminal angioplasty (PTA), with or without stenting, has become a widely adopted alternative to open surgery. Compared to surgical options, PTA offers shorter recovery times, lower complication rates, and comparable long-term outcomes [3]. As the technology and techniques for endovascular interventions continue to evolve, their role in the management of symptomatic subclavian artery stenosis is expanding, making them the first-line treatment for many patients [4].

METHODS

Study Population

Between December 2021 and December 2024, 6 patients with symptomatic subclavian artery stenosis

were treated at the vascular surgery department of Moulay Ismail Military Hospital in Meknes. Symptoms included upper limb claudication (5/6), subclavian steal syndrome (3/6), and dizziness (2/6). Comorbidities included hypertension (5/6), dyslipidemia (3/6), and active or past smoking (4/6).

Procedure

All procedures were performed under local anesthesia using radial or femoral arterial access. Balloon angioplasty was performed in all cases. Stents were deployed in 4 patients with significant residual stenosis (>30%). The selection of self-expanding stents for calcified or complex lesions aligns with current clinical recommendations [4].

Follow-Up

Patients were clinically evaluated and assessed by duplex ultrasound at 1, 3, 6, and 12 months post-procedure. Outcomes included symptom resolution, primary patency, and complications.

RESULTS

Technical success was achieved in all patients, with an average stenosis reduction of 87%. Symptom

resolution was complete in 5 patients (80%), while 1 patient reported partial improvement. A typical example of successful revascularization is shown in *Figure 1*.

Complications were minimal, with one case of minor hematomas at the puncture site, which resolved

spontaneously. No major complications, such as dissection or thrombosis, were reported. At the 12-month follow-up, all patients maintained primary patency without symptom recurrence.





Figure 1: Stenosis of proximal subclavian artery (A), balloon angioplasty (B) and stent implantation (C)

DISCUSSION

The results of this study confirm the efficacy and safety of PTA for the management of symptomatic subclavian artery stenosis. Our findings align with the broader literature, which reports technical success rates exceeding 90% and long-term patency rates above 80% [3-5].

Comparison with Surgery

While carotid-subclavian bypass remains an effective option for complex lesions or failed endovascular interventions, it is associated with higher perioperative risks, such as wound infections and prolonged recovery times [2]. PTA provides comparable clinical outcomes, with significantly reduced morbidity and shorter hospitalization periods, making it a preferred first-line approach for most patients [4].

Role of Stenting

Stents were used in 67% of cases in this series, significantly improving outcomes by reducing restenosis rates and maintaining patency over the follow-up period. Studies have shown that self-expanding stents are particularly effective for treating calcified or complex lesions, enhancing the long-term success of the intervention [6]. The use of drug-eluting stents in select cases has further reduced restenosis rates and may offer additional benefits in preventing complications in high-risk patients [7].

Complications

Complications were minimal in this series, with only one minor hematoma reported. No major complications, such as dissection or thrombosis, occurred. These findings support the safety profile of PTA as a minimally invasive option for subclavian artery stenosis [5].

CONCLUSION

PTA with or without stenting is a safe and effective treatment for symptomatic subclavian artery stenosis. With high technical success rates, low complication rates, and favorable long-term outcomes, it should be considered the first-line therapy for most patients, particularly those at high surgical risk.

REFERENCES

1. Zhao, T. Y., Xu, G. Q., & Xue, J. Y. (2024). Effects of percutaneous endovascular angioplasty for severe stenosis or occlusion of subclavian artery. *Sci Rep*, *14*(1), 14290.
2. Wrotniak, L., Kablak-Ziembicka, A., & Roslawiecka, A. (2016). Resolution of ischemic symptoms after percutaneous angioplasty for a symptomatic subclavian artery stenosis. *J Vasc Surg*, *64*(3), 684-91.
3. Sixt, S., Rastan, A., & Schwarzwälder, U. (2009). Results after balloon angioplasty or stenting of atherosclerotic subclavian artery obstruction. *Catheter Cardiovasc Interv*, *73*(3), 395-403.

4. Ahmed, A. T., Mohammed, K., & Chehab, M. (2016). Comparing Percutaneous Transluminal Angioplasty and Stent Placement for Treatment of Subclavian Arterial Occlusive Disease: A Systematic Review and Meta-Analysis. *Cardiovasc Intervent Radiol*, 39(5), 652-667.
5. Van Nut, L., Vinh, P., & Vuong, N. (2023). Endovascular Treatment for Subclavian Artery Stenosis and Occlusion: A Single-Center Retrospective Study. *Cureus*, 15(9), e44699.
6. Niu, G., Yan, Z., & Zhang, B. (2020). Endovascular Treatment of Chronic Total Occlusion in the Subclavian Artery: A Review of 23 Cases. *Front Neurol*, 11, 264.
7. Babic, S., Sagic, D., & Radak, D. (2012). Initial and Long-Term Results of Endovascular Therapy for Chronic Total Occlusion of the Subclavian Artery. *Cardiovasc Intervent Radiol*, 35(2), 255-262.