fortune Journals

Case Report

ARCHIVES OF CLINICAL AND MEDICAL CASE REPORTS

ISSN: 2575-9655

Stellate Ganglion Block in Anxiety Disorder with Coexistent Resistant Hypertension: A Report

G Niraj[1*], N Charan[2], PV Ram Mohan[3], S Niraj[4]

Abstract

Autonomic nervous system dysfunction is reported in the neurobiology of both anxiety disorder and resistant hypertension. Stellate ganglion block can dampen sympathetic activity and has been effective in the management of treatment-resistant anxiety disorder. Patients with anxiety disorder and coexistent resistant hypertension were reviewed by an interdisciplinary team comprising clinical psychologists, general medicine physicians, and pain medicine and palliative care physicians. Patients were offered stellate ganglion blocks in the management of treatment-resistant anxiety disorder. A validated outcome measure was completed at baseline and post-intervention. Eight patients with anxiety disorder with coexistent resistant hypertension, who underwent stellate ganglion blocks are presented. The intervention resulted in an improvement in anxiety symptoms with enhanced blood pressure control at the 24-week review in seven patients (7/8, 88%). There was a mean reduction of 21 mm Hg in systolic blood pressure and 11 mm Hg in diastolic blood pressure at the 24-week review. All patients were able to reduce antihypertensive medications. Stellate ganglion block could have a role in the management of resistant hypertension with comorbid anxiety.

Keywords: Stellate ganglion block; Resistant hypertension; Sympathetic overactivity; Anxiety disorder; Two level SGB

Introduction

Resistant hypertension (rHTN) is defined as blood pressure that remains above goal despite compliance with at least three antihypertensive medications, including a diuretic, all at maximum tolerated doses, or blood pressure controlled on at least four drugs [1, 2]. rHTN affects a large proportion of the hypertensive population and is associated with increased cardiovascular morbidity and mortality [1, 2]. There is significant co-occurrence of hypertension with anxiety [3]. In addition, anxiety is associated with resistance to hypertension treatment [4]. Interestingly, the neurobiology of treatment-resistant anxiety disorder (TR-AD) and rHTN share a common pathway, which is sympathetic overactivity [5-7]. Sympathetic overactivity has also been reported to contribute to blood pressure variability in patients with hypertension [6]. Stellate ganglion block (SGB) inhibits the sympathetic nervous system and is effective in patients with treatment-resistant mental health disorders, including anxiety disorder [8, 9]. At our center, dual SGB is the standard management of treatment-resistant anxiety disorder (TR-AD) [8, 9]. We present eight patients with anxiety disorder and coexistent rHTN treated with dual SGB.

Affiliation:

[1]Senior Consultant, Department of Pain Medicine, SMSIMSR, India

[2]Assistant Professor, Department of Anesthesia & Pain Medicine, SMSIMSR, India

[3]Senior Medical Officer, Department of Medicine, SMSIMSR, India

[4]Senior Clinical Psychologist, Department of Psychiatry, SMSIMSR, India

***Corresponding Author**
Dr G Niraj MD, FRCA, FFPMRCA, Senior Consultant, Department of Pain Medicine, Sri Madhusudan Sai Institute of Medical Sciences & Research, Chikkaballapur district, Karnataka, India.

Citation: G Niraj, N Charan, PV Ram Mohan, S Niraj. Stellate Ganglion Block in Anxiety Disorder with Coexistent Resistant Hypertension: A Report. Archives of Clinical and Medical Case Reports. 10 (2026): 67-72.

Received: March 08, 2026
Accepted: March 17, 2026
Published: March 27, 2026

Case Report

Patients presenting with treatment-resistant AD and comorbid rHTN were initially assessed by an interdisciplinary team (IDT) at Sri Madhusudan Sai Institute of Medical Sciences & Research, a tertiary care medical college in South India. The IDT is comprised of clinical psychologists, general medicine physicians, and pain medicine and palliative physicians. Patients were offered a trial of ultrasound-guided dual SGB. Dual SGB is a standard intervention for treatment-resistant mental disorders at our center [8, 9]. Patients treated by the IDT are prospectively followed-up as a part of a longitudinal prospective service evaluation to assess patient satisfaction with the IDT management. The project is registered with the Institutional Clinical and Medical Audit Committee (SMSIMSR/CMAC/17C). Patient satisfaction was assessed by a 5-point Likert scale (very satisfied, satisfied, neutral, dissatisfied, very dissatisfied). Since the start of this ongoing service evaluation in 2023, 161 patients with heterogenous treatment-resistant mental health disorders have been reviewed in the IDT. Thirty-six patients reported comorbid hypertension, which included eight patients with resistant hypertension.

Patients were provided an information sheet detailing the technique and the rationale for offering it. Informed written consent was obtained. Patients also provided separate written consent for their de-identified data to be used for publication in a peer-reviewed journal. Two SGBs were performed as an outpatient procedure, with an interval of 1-7 days between the blocks. The validated outcome measure (Generalized Anxiety Disorder scale, GAD-7) was completed at baseline and at review post-intervention. Technical details of ultrasound-guided SGB have been previously reported [8]. The injectate consisted of 7 ml of 0.25% bupivacaine, 1 ml of 2% lidocaine, and 20 mg of depot methylprednisolone.

Automated office blood pressure (AOBP) measurements were performed with a specialized oscillometric device (Phillips Efficia CM12 Multipara Patient Monitor, Amsterdam, Netherlands) that allowed for repeated blood pressure measures, five minutes apart, with the patient seated alone in a quiet room (unattended) [2].

Case 1

A 28-year-old male initially presented to the hospital for an anterior cruciate ligament repair and was diagnosed with poorly controlled blood pressure on two medications (Telmisartan 80 mg, Cilnidipine 20 mg). He was compliant with medications and reported high blood pressure during home recording. Despite additional beta-blocker therapy (atenolol), initiated during the perioperative period, blood pressure did not achieve the therapy goal. Secondary hypertension was ruled out. He reported excess alcohol intake and a disturbed sleep pattern.

Following recovery post-surgery, he was reviewed in the IDT clinic and was diagnosed with severe anxiety disorder and resistant hypertension. He had previously trialed duloxetine without benefit and declined further medications. He had undergone eight sessions of cognitive behavioral therapy. He was offered dual SGB to control anxiety symptoms. Over the next 24 weeks, he was able to discontinue Cilnidipine and reduce Telmisartan to 40 mg/day. He reported significant improvement in anxiety symptoms, improved sleep patterns, and overall well-being.

Case 2

A 64-year-old, recently diagnosed with carcinoma of the breast and scheduled for modified radical mastectomy, was referred to the MDT clinic. She had initially presented to the hospital in hypertensive crisis despite being on three medications (telmisartan 80 mg, Hydrochlorothiazide 25 mg, amlodipine 5 mg). Atenolol 50 mg was added, and the surgery was deferred. Three weeks later, surgery had to be further rescheduled due to poorly controlled hypertension. Investigations ruled out secondary hypertension.

The surgical team referred her to the IDT clinic to manage anxiety symptoms , which was a possible factor in indigent blood pressure control. The patient reported twenty years of severe anxiety symptoms. She had previously trialed amitriptyline without benefit and was declined to engage with our psychology service. She underwent dual SGB. At three-week review, blood pressure achieved therapy goal, and she was able to undergo oncological surgery. Anti-hypertensive medications were weaned over the next 12 weeks (Table 2).

Case 3

A 48-year-old woman was referred to the IDT with severe anxiety disorder and refractory hypertension. She was on five medications including Losartan 50 mg, Metoprolol 100 mg, Atenolol 50 mg, Amlodipine 5 mg and Hydrochlorothiazide 12.5 mg. She reported good compliance with medications. Secondary hypertension was ruled out. She was on medication for underactive thyroid and had previously trialed duloxetine for anxiety. At 4-week review post dual SGB, blood pressure therapy goal. She reported significant improvement in anxiety and sleep pattern. Over the next eight weeks, she was able to discontinue atenolol and amlodipine. Details of the remaining patients are provided in Tables 1-3.

Discussion

The report presents the successful management of eight patients with anxiety disorder and coexistent resistant hypertension. To the best of our knowledge, this is the first report that details the benefit of dual stellate ganglion block for enhancing blood pressure control in patients with resistant hypertension. We observed substantial improvement in

G Niraj, et al., Arch Clin Med Case Rep 2026
DOI:10.26502/acmcr.96550752

Table 1: Demographics and patient characteristics.

	Age	Gender	BMI	Duration since diagnosis of HTN	Co Morbidity	Employment	Patient Satisfaction at
	(years)			(years)			24 weeks
Case 1	28	M	31	5	Alcohol misuse	Yes	Very satisfied
Case 2	64	F	32	15	DM, CA Breast	Retired	Very satisfied
Case 3	48	F	20	10	Hypothyroidism	Yes	Very satisfied
Case 4	66	M	28	8	DM	Yes	Very satisfied
Case 5	48	M	26	7	DM	Yes	Very satisfied
Case 6	55	M	26	6	DM	Yes	Satisfied
Case 7	71	F	27	8	None	Retired	Very satisfied
							Very satisfied
Case 8	53	F	36	25	DM, Hypothyroid	Yes	

HTN hypertension, DM diabetes mellitus, CA carcinoma, BMI body mass index,

Table 2: Anxiety scores and medications following dual Stellate Ganglion Block.

	Baseline	4-week	12-week	24-week	Baseline	4-week	12-week	24-week
S. No	GAD-7	GAD-7	GAD-7	GAD-7	Med	Med	Med	Med
					(mg)	(mg)	(mg)	(mg)
					T 80	T 80	T 80	T 40
Case 1	18	6	5	5	Cil 20	Cil 20		
					Aten 50			
					T 80	T 80	T 80	T 80
Case 2	15	5	4	5	CT 25	CT 25	CT 25	CT 25
					Aten 50			
					Aml 10			
					Los 50	Los 50	Los 50	Los 50
					Met 100	Met 100	Met 100	Met 100
Case 3	15	6	4	5	Aten 50	CT 12.5	CT 12.5	CT 12.5
					Aml 5			
					CT 12.5			
Case 4	11	6	3	2	T 80	T 80	T 80	T 80
					CT 12.5	CT 12.5	CT 12.5	CT 12.5
					Aml 10			
Case 5	10	0	1	2	Los 100	Los 70	Los 70	Los 70
					CT 12.5	CT 12.5	CT 12.5	CT 12.5
					Aml 10			
Case 6	17	15	11	7	Los 100	Los 100	Los 100	Los 100
					CT 12.5	CT 12.5	CT 12.5	CT 12.5
					Aml 5			
					Los 100	Los 100	Los 70	Los 70
Case 7	14	10	8	5	CT 12.5	CT 12.5	Aten 50	Aten 50
					Aten 50	Aten 50	CT 12.5	CT 12.5
					Aml 5			
					Met 50	Met 50	Met 50	Met 50
Case 8	10	4	6	10	Los 100	Los 100	Los 100	Los 100
					CT 12.5	CT 12.5	CT 12.5	CT 12.5
					Cil 20			Cil 10

GAD-7 Generalized Anxiety Disorder scale, Med medications, T telmisartan, Cil cilnidipine, Aml amlodipine, Met metoprolol, CT chlorothiazide, Los losartan, Aten atenolol

Citation: G Niraj, N Charan, PV Ram Mohan, S Niraj. Stellate Ganglion Block in Anxiety Disorder with Coexistent Resistant Hypertension: A Report. Archives of Clinical and Medical Case Reports. 10 (2026): 67-72.

Table 3: Outcomes following dual Stellate Ganglion Block.

S. No	Baseline BP (mm Hg)	4-week BP (mm Hg)	12-week BP (mm Hg)	24-week BP (mm Hg)	Reduction in BP over 24 weeks (mm Hg)	Baseline HR (bpm)	12-week HR (bpm)	24-week HR (bpm)
Case 1	168/110	140/90	126/84	140/82	**1.4**	98	78	74
Case 2	204/88	133/68	118/68	140/78	**6.4**	109	88	78
Case 3	178/104	136/80	150/88	167/87	**-11 / -17**	106	82	86
Case 4	150/86	147/78	144/79	148/78	**-2 / -8**	88	88	96
Case 5	146/90	125/85	144/85	139/87	**-7 / -3**	84	69	78
Case 6*	144/91	112/80	150/90	142/84	**-2 / -7**	82	86	88
Case 7	188/69	160/77	154/70	147/61	**-34 / - 8**	66	74	69
Case 8	166/92	143/72	114/70	146/76	**-20 / - 16**	62	62	60

BP blood pressure, HR heart rate, bpm beats per minute
*Case 6 underwent two level stellate ganglion blocks at 12-week review.

anxiety symptoms, blood pressure, and heart rate. All eight patients were able to reduce the dose of at least one anti-hypertensive medication at 24-week review.

In our hypertension clinic based in rural India, resistant hypertension is diagnosed in one in six patients. Resistant hypertension is recognized as a major public health concern [2]. It is estimated to affect approximately 10% of the 230 million patients with hypertension in India [10]. rHTN is associated with significant cardiovascular, cerebrovascular, and renal comorbidity [2, 10]. Recommended treatment options include spironolactone, mineralocorticoid receptor antagonists, and promising newer medications [2]. The neurobiology of rHTN is attributed to autonomic dysfunction with sympathetic overactivity [4-6]. The use of microneurographic techniques has provided robust evidence of sympathetic overactivity in the pathogenesis and progression of hypertension [11]. Inhibiting sympathetic overactivity by nephrectomy during renal transplantation or by renal denervation has been shown to reverse hypertension-mediated organ damage [12]. Stellate ganglion block downregulates the sympathetic nervous system, thereby allowing for a resetting of the autonomic nervous system. Patients in this cohort had substantial improvement in automated office blood pressure and anxiety symptoms and reported high satisfaction (Table 1). A positive association between comorbid anxiety and hypertension has been reported [4]. Patients with rHTN report increased stress and anxiety [13]. Dysautonomia, specifically sympathetic overactivity, is the common neurobiological thread linking rHTN with anxiety [7].

In addition to downregulating the sympathetic overactivity, SGB can enhance parasympathetic activity [14]. SGB could also have a cardioprotective role in patients with rHTN and comorbid anxiety. An overactivated sympathetic system can increase the excitability of cardiomyocytes, leading to an increased heart rate and instability of electrical activity [15, 16]. Additionally, SGB has demonstrated potential in attenuating neuroinflammation as well as perioperative stress response [17, 18]. In one patient (Case 6), the blood pressure, which was under control at the 12-week review, returned to the pre-SGB level at the 24-week review. Although the severe anxiety symptoms (baseline GAD-7 = 17) had reduced following dual SGB, the patient reported moderate anxiety (GAD-7 = 11) at 12 -week review. As the anxiety symptoms were persisting, the patient was offered two-level SGB. At the 4-week review post two-level SGB, the patient's blood pressure, heart rate, and anxiety symptoms achieved satisfactory control (Tables 2, 3). We have previously reported on a subset of patients with moderate-to-severe anxiety disorder who respond partially to dual SGB and achieve improved symptom control with two-level SGB [8, 17].

The authors are aware of the significant drawbacks of this report on a small cohort with limited follow-up of 24 weeks. However, there is a pressing need for innovative strategies in managing rHTN, particularly in low- to middle-income countries. The impact of rHTN on both the patient and the society is substantial. SGB appears to be a rational choice since sympathetic dominance underlies the neurobiology of rHTN [4-6, 12]. Effective blood pressure control can reduce the risk of cardiovascular disease. A 10 mm Hg lower systolic or 5 mm Hg lower diastolic blood pressure predicts a 40% reduction in risk of stroke and a 30% reduction in risk of ischemic heart disease. Even a 5 mm Hg reduction of systolic blood pressure can reduce the risk of significant cardiovascular morbidity by 10% [12, 19, 20]. In this cohort, at the 24-week review, there was a mean reduction of 21 mm Hg in the systolic blood pressure and 11 mm Hg in the diastolic blood pressure.

There is evidence that untreated anxiety could impede blood pressure control. Further research is mandated to elucidate the exact mechanism of action of SGB. In addition, the role of steroids in the injectate requires clarification. In our experience, adding steroids to local anesthetic agent enhances the durability of SGB. We recommend definitive studies to confirm these initial observations.

Ethical Review

Ethical review was not required as this service evaluation.

Informed Consent

Informed written consent was taken from all the patients included in this report.

Author contributions

G Niraj: helped in the concept, design, performed intervention, drafting the manuscript

N Charan: performed intervention, helped in data collection and drafting the manuscript

PV Ram Mohan: helped in data collection and drafting the manuscript

S Niraj: helped in concept, design and drafting the manuscript

Data Availability

Data is available from the corresponding author upon reasonable request.

References

1. Carey RM, Calhoun DA, Bakris GL, et al. Resistant Hypertension: Detection, Evaluation, and Management: A Scientific Statement from the American Heart Association. Hypertension 72 (2018): e53-90.
2. Schiffrin EL, Fisher ND. Diagnosis and management of resistant hypertension. BMJ 385 (2024): e079108.
3. Hamam MS, Kunjummen E, Hussain MS, et al. Anxiety, depression, and pain: considerations in the treatment of patients with uncontrolled hypertension. Curr Hypertens Rep 22 (2020): 106.
4. Duman H, Duman H, Pusuroğlu M, et al. Anxiety disorders and depression are associated with resistant hypertension. Adv Clin Exp Med (2023).
5. Dudenbostel T, Acelajado MC, Pisoni R, et al. Refractory hypertension: evidence of heightened sympathetic activity as a cause of antihypertensive treatment failure. Hypertension 66 (2015): 126-133.
6. Grassi G, Bombelli M, Brambilla G, et al. Total cardiovascular risk, blood pressure variability and adrenergic overdrive in hypertension: evidence, mechanisms and clinical implications. Curr Hypertens Rep 14 (2012): 333-338.
7. Shinba T. Major depressive disorder and generalized anxiety disorder show different autonomic dysregulations revealed by heart-rate variability analysis in first-onset drug-naïve patients without comorbidity. Psychiatry Clin Neurosci 71 (2017): 135-145.
8. Niraj G, Karanth V, Niraj S, et al. Stellate ganglion block in disparate treatment-resistant mental health disorders: A case series. Scand J Pain 25 (2025): 20240071.
9. Niraj G, Karanth V, Charan N, et al. Dual Stellate Ganglion block in the management of Treatment Resistant Anxiety Disorder: a randomized double-blind placebo-controlled trial. Pain Physician (2026).
10. Mittal S, Jain P, Sharma R, et al. Approaches in Managing Resistant Hypertension: A Review. Cureus 16 (2024).
11. Grassi G, Drager LF. Sympathetic overactivity, hypertension and cardiovascular disease: state of the art. Curr Med Res Opin 40 (2024): 5-13.
12. Bhatt DL, Vaduganathan M, Kandzari DE, et al. Long-term outcomes after catheter-based renal artery denervation for resistant hypertension: final follow-up of the randomised SYMPLICITY HTN-3 Trial. Lancet 400 (2022): 1405-1416.
13. Schmieder RE, Grassi G, Kjeldsen SE. Patients with treatment-resistant hypertension report increased stress and anxiety: a worldwide study. J Hypertens 31 (2013): 610-615.
14. Kim JJ, Chung RK, Lee HS, et al. The changes of heart rate variability after unilateral stellate ganglion block. Korean J Anesthesiol 58 (2010): 56-60.
15. Hennis K, Piantoni C, Biel M, et al. Pacemaker channels and the chronotropic response in health and disease. Circ Res 134 (2024): 1348-1378.
16. Calandra-Buonaura G, Provini F, Guaraldi P, et al. Cardiovascular autonomic dysfunctions and sleep disorders. Sleep Med Rev 26 (2016): 43-56.
17. Niraj G, Charan N, Niraj S, et al. Precision health optimization program in the management of advanced Parkinson's Disease: a case series. Cureus 18 (2026): e101146.
18. Lipov E, Gluncic V, Lukić IK, et al. How does stellate ganglion block alleviate immunologically-linked disorders? Med Hypotheses 144 (2020): 110000.
19. Ettehad D, Emdin CA, Kiran A, et al. Blood pressure

lowering for prevention of cardiovascular disease and death: a systematic review and meta-analysis. Lancet 387 (2016): 957-967.

20. Rahimi K, Bidel Z, Nazarzadeh M, et al. Pharmacological blood pressure lowering for primary and secondary prevention of cardiovascular disease across different levels of blood pressure: an individual participant-level data meta-analysis. Lancet 397 (2021): 1625-1636.

Citation: G Niraj, N Charan, PV Ram Mohan, S Niraj. Stellate Ganglion Block in Anxiety Disorder with Coexistent Resistant Hypertension: A Report. Archives of Clinical and Medical Case Reports. 10 (2026): 67-72.