

# Case Report

## Electroconvulsive Therapy in an Elderly Patient with Severe Aortic Stenosis: A Case Report and Review of Literature

Himanshu Singla, Sandeep Grover

### ABSTRACT

Electroconvulsive therapy (ECT) is one of the safest treatment options for psychiatric illnesses with no absolute contraindications. However, certain medical conditions including cardiac ailments such as aortic stenosis are associated with increased risk with ECT. We present the case of a 74-year-old female who was suffering from severe depression with psychotic symptoms (which had not responded to two adequate trials of antidepressants), along with severe aortic stenosis, who was managed with modified bilateral ECT and review the available literature.

**Key words:** Aortic stenosis, elderly, electroconvulsive therapy

### INTRODUCTION

Electroconvulsive therapy (ECT) is a well-established treatment for various psychiatric conditions.<sup>[1]</sup> Remission rates with ECT range from 70% to 90% in patients with major depression with older age conferring the greater likelihood of remission.<sup>[2]</sup> As such, there are no absolute contraindications for the use of ECT. The American Psychiatric Association Task Force report<sup>[3]</sup> on ECT recommends careful assessment of patients before ECT when the patient has certain medical conditions which can pose substantial risk to use of ECT. These include unstable/severe cardiovascular disease, space-occupying intracranial lesion, recent cerebral hemorrhage or stroke, bleeding or otherwise unstable


vascular aneurysm, severe pulmonary condition, or high risk with anesthesia rated as the American Society of Anesthesiologists Class 4 or 5.<sup>[3]</sup>

Severe aortic stenosis has been reported to increase the risk of noncardiac operation, but this group of patients can undergo noncardiac procedures at a reasonably low risk with careful monitoring of anesthesia.<sup>[4]</sup> In these patients, acute hypotension can be potentially hazardous<sup>[5]</sup> since coronary perfusion pressure may be compromised because of the combination of low aortic diastolic pressure<sup>[6]</sup> and elevated left ventricular end-diastolic pressure.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** reprints@medknow.com

**How to cite this article:** Singla H, Grover S. Electroconvulsive therapy in an elderly patient with severe aortic stenosis: A case report and review of literature. Indian J Psychol Med 2018;40:288-91.

Access this article online	
Website: www.ijpm.info	Quick Response Code 
DOI: 10.4103/IJPSYM.IJPSYM_152_17	

Department of Psychiatry, Postgraduate Institute of Medical Education and Research, Chandigarh, India

**Address for correspondence:** Dr. Sandeep Grover

Department of Psychiatry, Postgraduate Institute of Medical Education and Research, Chandigarh - 160 012, India.

E-mail: drsandeepg2002@yahoo.com

There is limited literature on the use of ECT in patients with severe aortic stenosis.<sup>[7-11]</sup> We present a case of 74-year-old female, having severe aortic stenosis, who received modified bilateral ECT for treatment-resistant depression and discuss the practical considerations involved in the case.

## CASE REPORT

A 74-year-old female who had been diagnosed with hypertension 15 years prior to presentation, hypothyroidism 8 years before presentation, and aortic stenosis 2 years before presentation, presented with the first episode depression of insidious onset for the past 9 months, precipitated by a life stressor. Exploration of history revealed that initially she developed sadness of mood, anhedonia, tiredness, bleak and pessimistic views of future, disturbed sleep, and poor appetite. Over the next 2–3 months, the symptoms progressed further, and she additionally developed suicidal ideations, poor attention and concentration, low self-esteem, and delusion of poverty. She had received adequate trials of tablet escitalopram (10–20 mg/day for 3 months) and sertraline (up to 150 mg/day) along with quetiapine (50–100 mg) for 6 weeks without much improvement in psychopathology. While receiving the combination of sertraline and quetiapine, she developed side effects in the form of bradykinesia, rigidity, and tremors.

When evaluated for the first time at the inpatient setting at our center, she was found to have sadness of mood, marked psychomotor retardation, delusion of poverty, suicidal ideations, marked sleep disturbances, and poor oral intake. A diagnosis of severe depression with psychotic symptoms was considered.

She was receiving tablet torsemide 20 mg/d and tablet amlodipine 5 mg/d for hypertension, and tablet thyroxine 50 µg/day for the hypothyroidism. On investigation, she was found to have features suggestive of raised serum urea (55 mg/dl) and creatinine levels (1.6 mg/dl), which were considered to be suggestive of prerenal acute renal failure most likely due to reduced oral intake. All other investigations in the form of hemogram, serum electrolytes, liver function tests, and X-ray chest were found to be within normal limits. Initially, she was treated with tablet mirtazapine up to 22.5 mg/day for 3 weeks, but there was no improvement. However, during this period, her renal status improved over 1 week with oral rehydration and renal diet. Following this, ECT was considered. On further investigation, her echocardiography revealed severe aortic stenosis (aortic valve area 0.8 cm<sup>2</sup> [normal values - 2.5–4.5 cm<sup>2</sup>]) with the normal left ventricular

function. The aortic stenosis velocity was 4.3 m/s and left ventricular ejection fraction was 60%–65%. Her electrocardiogram revealed T wave inversion in leads I, II, aVL, V<sub>4</sub>–V<sub>6</sub>. History was again reviewed and patient had no history suggestive of dyspnea, angina, syncope, and congestive heart failure.

She was cleared for ECT under high-risk consent and it was decided to administer ECT in a setting where all the equipments for cardiopulmonary resuscitation were available in case of any cardiac emergency. ECT was administered without the use of anticholinergics and injection esmolol was given before ECT. She was properly oxygenated during the ECT procedure. Throughout the procedure and 2 h after the procedure, her electrocardiogram, blood pressure, heart rate, and oxygen saturation were closely monitored. She received nine effective bilateral modified ECTs, all of which were uneventful and by the end of ECT course, and she achieved clinical remission and was discharged on tablet mirtazapine 30 mg/day. She has been maintaining well thereafter for the past 2 years.

## DISCUSSION

The present case adds to the limited literature on the use of ECT in patients with severe aortic stenosis. A review of existing literature [Table 1] shows that there are only 5 cases reports and a small study in which ECT was used in 10 patients with aortic stenosis.<sup>[7-12]</sup> In all these reports, all the patients except one<sup>[8]</sup> were elderly and ECT was used successfully without much complications in all the cases except one report,<sup>[10]</sup> in which a patient developed bradycardia in the 1<sup>st</sup> session and ECT was withheld after that.

As recommended by Mueller *et al.*, 2007<sup>[9]</sup> index case was adequately investigated including carrying out echocardiography before starting of ECT. In accordance with the recommendations, patient was also evaluated for blood cell count, electrolytes, and creatinine before start ECT.<sup>[9]</sup>

Three main hemodynamic goals have been suggested while giving ECT in patients with aortic stenosis, these include maintenance of optimal values for stroke volume, heart rate, peripheral vascular tone, and venous return.<sup>[13]</sup> Other authors suggest that it is important to avoid hypotension, decrease in preload, systemic vascular resistance, and contractility as well as excessive tachycardia.<sup>[9]</sup> In many of the existing case reports, these issues were taken care off. In the index case, short-acting beta blocker, injection esmolol, was given to the patient to take care of the anticipated hemodynamic changes as was done in some of the

**Table 1: Available data on the use of electroconvulsive therapy among patients with severe aortic stenosis**

Author	Age/sex	Diagnosis psychiatry	Severity of aortic stenosis	Medical comorbidity	History of ECT	Type of ECT/ number of ECT	Pretreatment/ induction/MR	Outcome
Rasmussen 1997 <sup>[7]</sup>	64/female	RDD, severe depression with psychotic symptoms	Moderate aortic stenosis (valve area - 0.8 cm <sup>2</sup> ). LVEF - 60%-65% (normal)	Not mentioned	Yes	Right unilateral ECT	Glycopyrrolate/methohexital/succinylcholine Pretreatment with esmolol in 3 sessions	Uneventful 6 ECTs, clinical improvement
Rasmussen 1997 <sup>[7]</sup>	72/female	Bipolar depression	Severe aortic stenosis (valve area - 0.5 cm <sup>2</sup> ). Normal LVEF - 65%	CT head showed periventricular white matter disease	No	Bilateral ECTs	Methohexital/succinylcholine	Uneventful 15 ECTs, clinical improvement
Levin <i>et al.</i> , 2000 <sup>[8]</sup>	46/female	Psychotic depression	Critical aortic stenosis (systolic pressure gradient across the aortic valve - 93 mmHg and aortic valve area - 0.7 cm <sup>2</sup> ). LVEF - 79%(normal)	Pulmonary hypertension, renal failure	No	Unilateral brief pulse with no dose titration	Etomidate/mivacurium Pre-ECT treatment with infusion of sodium nitroprusside and a bolus of esmolol few seconds before stimulus	Episodes of transient interstitial pulmonary edema in 2 settings, sudden death 96 h after 4th ECT
Mueller <i>et al.</i> , 2007 <sup>[9]</sup>	10 patients, 6 female, mean age 79.5 years range (65-93)	9-major depression, 1-catatonia	All had severe aortic stenosis (with aortic valve area - ≤1 cm <sup>2</sup> ). With normal LV function (LVEF - 69%, range - 55%-70%)	Not mentioned	Not mentioned	ECT	Not mentioned	Uneventful with transient changes in blood pressure. No death within 24 h of procedure
Sutor <i>et al.</i> , 2008 <sup>[10]</sup>	75/female	Psychotic	Severe (valve area - 0.84 cm <sup>2</sup> ; mean aortic transvalvular pressure - 32 mmHg; aortic valve velocity - 4.4 m/s)	Hypertension, coronary artery disease, hypothyroidism	Yes	Bitemporal ECT	Glycopyrrolate/remifentanyl + sodiumthiopentone/succinylcholine	Bradycardia, hypotension. No seizure. ECT with-held
O'Reardon <i>et al.</i> , 2008 and 2011 <sup>[11,12]</sup>	96/female	RDD with severe depression	Severe (aortic valve area of 0.5 cm <sup>2</sup> , with a peak gradient across the valve of 110 mmHg and a mean gradient of 69 mm Hg LVEF - 70%)	Hypertension, hypothyroidism, pernicious anemia	Yes	Bifrontal ECT	Methohexital + remifentanyl/succinylcholine	Uneventful with transient increase in BP. Improvement clinically after 9 treatments and later maintained on 1/month

LVEF – Left ventricular ejection fraction; CT – Computed tomography; ECT – Electroconvulsive therapy; BP – Blood pressure; RDD – Recurrent Depressive Disorder

previous case reports.<sup>[7-9,11,12]</sup> In addition, anticholinergic was avoided and post-ECT recovery was monitored extensively for any delayed event, as suggested in some of the previous case reports.<sup>[8,9,12]</sup>

## CONCLUSION

The index case suggests that ECT can be given safely in patients with medical illnesses like severe aortic stenosis and there are no absolute contraindications

for ECT. However, special care should be taken when administering ECT in patients with severe aortic stenosis. Careful evaluation by the cardiology and anesthesiology services is mandated to assess risk and to minimize risk, and high index of suspicion is required for timely intervention to minimize the mortality in these patients.

## Financial support and sponsorship

Nil.

**Conflicts of interest**

There are no conflicts of interest.

**REFERENCES**

1. Accornero F. An eyewitness account of the discovery of electroshock. *Convuls Ther* 1988;4:40-49.
2. O'Connor MK, Knapp R, Husain M, Rummans TA, Petrides G, Smith G, *et al.* The influence of age on the response of major depression to electroconvulsive therapy: A C.O.R.E. Report. *Am J Geriatr Psychiatry* 2001;9:382-90.
3. American Psychiatric Association. The Practice of Electroconvulsive Therapy: Recommendations for Treatment, Training and Privileging. Washington, DC: APA Press; 2001.
4. O'Keefe JH Jr., Shub C, Rettke SR. Risk of noncardiac surgical procedures in patients with aortic stenosis. *Mayo Clin Proc* 1989;64:400-5.
5. Sethna DH, Starr NJ, Estafanous FG. Cardiovascular effects of non-depolarizing neuromuscular blockers in patients with aortic valve disease. *Can J Anaesth* 1987;34:582-8.
6. Marcus ML, Doty DB, Hiratzka LF, Wright CB, Eastham CL. Decreased coronary reserve: A mechanism for angina pectoris in patients with aortic stenosis and normal coronary arteries. *N Engl J Med* 1982;307:1362-6.
7. Rasmussen KG. Electroconvulsive therapy in patients with aortic stenosis. *Convuls Ther* 1997;13:196-9.
8. Levin L, Wambold D, Viguera A, Welch CA, Drop LJ. Hemodynamic responses to ECT in a patient with critical aortic stenosis. *J ECT* 2000;16:52-61.
9. Mueller PS, Barnes RD, Varghese R, Nishimura RA, Rasmussen KG. The safety of electroconvulsive therapy in patients with severe aortic stenosis. *Mayo Clin Proc* 2007;82:1360-3.
10. Sutor B, Mueller PS, Rasmussen KG. Bradycardia and hypotension in a patient with severe aortic stenosis receiving electroconvulsive therapy dose titration for treatment of depression. *J ECT* 2008;24:281-2.
11. O'Reardon JP, Cristancho MA, Cristancho P, Fontecha JF, Weiss D. Electroconvulsive therapy in a 96-year-old patient with severe aortic stenosis: A case report and review of the literature. *J ECT* 2008;24:96-8.
12. O'Reardon JP, Cristancho MA, Ryley B, Patel KR, Haber HL. Electroconvulsive therapy for treatment of major depression in a 100-year-old patient with severe aortic stenosis: A 5-year follow-up report. *J ECT* 2011;27:227-30.
13. Stoelting RK, Dierdorf SF. *Anesthesia and Co-existing Disease*. 3<sup>rd</sup> ed. New York: Churchill Livingstone; 1993. p. 32-5.