

Severe hyponatraemia in a patient with a large left atrial myxoma: a case report

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Background

Atrial myxomas (AMs) are the most commonly encountered cardiac tumours. They can be genetically inherited and are commonly found in the left atrium. They usually present with dyspnoea, syncopal episodes, heart failure from mitral valve obstruction, and constitutional symptoms including weight loss, fatigue, and fever. We present a rare case of severe symptomatic hyponatraemia secondary to a large AM and discuss possible aetiology.

Case summary

A 75-year-old Caucasian female presented with acute nausea, vomiting, confusion, and drowsiness. She had a background of palpitations for about 20 years. Her blood test results revealed severe hyponatraemia (serum sodium—103 mmol/L). Further investigations for hyponatraemia including serum cortisol and urine biochemistry suggested Syndrome of Inappropriate Anti-Diuretic Hormone (SIADH) secretion. Computer tomography scan revealed an incidental large left AM. Echocardiography confirmed the AM attached to the left side of the inter-atrial septum and occupying the majority of the left atrium. She was treated medically for hyponatraemia and referred for excision of myxoma. She underwent urgent resection of the myxoma once sodium levels were optimized. Postoperatively, her serum sodium remained low but gradually returned to normal on postoperative Day 11.

Conclusion

This is only the third reported case of significant hyponatraemia associated with a large AM. It has been previously hypothesized that large left AM stretch the atrium causing release of atrial natriuretic peptide and subsequent hyponatraemia. The excision of myxoma and reduction in left atrial size postoperatively with an improvement in sodium levels suggests an association between the two pathologies.

Keywords

Atrial myxoma • Hyponatraemia • Case report • Palpitations • Myxoma excision

ESC Curriculum

2.2 Echocardiography • 5.11 Cardiac resynchronization therapy devices • 6.1 Symptoms and signs of heart failure • 6.8 Cardiac tumours • 7.5 Cardiac surgery

Learning points

- Severe hyponatraemia can result in neurological symptoms—syncope, drowsiness, and constitutional symptoms of nausea, vomiting, fatigue, arthralgia, weight loss, and fatality.
- Large atrial myxomas can remain asymptomatic for long periods and may be found incidentally.
- Atrial myxomas can result in atrial stretch and hyponatraemia due to atrial natriuretic peptide secretion.
- Atrial myxomas require urgent surgical resection to prevent complications and it is important to correct hyponatraemia prior to surgery to minimize cerebral complications.

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Introduction

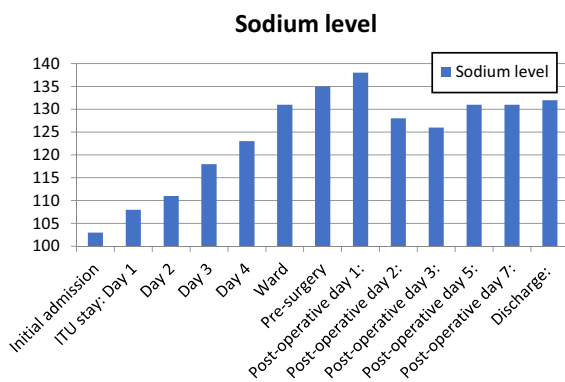
Myxomas are rare benign tumours of the heart. They may arise from atria or ventricles. Myxomas may be inherited and are more common in females.¹ Atrial myxomas (AMs) predominantly occur in the left atrium (LA).² They can present in a variety of ways including cardiac symptoms (dyspnoea, heart failure secondary to mitral valve obstruction), neurological symptoms (syncopal episodes), and constitutional symptoms (weight loss, fatigue, fever, and arthralgia).³ Echocardiography remains an important diagnostic tool for myxomas and many may be found incidentally.³

Atrial myxomas may induce overproduction of atrial natriuretic peptides (ANPs) due to excessive atrial stretching leading to hyponatraemia and hypovolaemia. Preoperative hyponatraemia is an independent risk factor for mortality, prolonged hospitalization, and postoperative complications.⁴

We present an interesting case of a patient with severe hyponatraemia who was found to have a large left AM incidentally. The hyponatraemia persisted in the postoperative period and gradually recovered over 10 days. This case suggests an association between left AM, left atrial stretch, and hyponatraemia.

Timeline

July 2021	Patient presents to local hospital with neurological symptoms found to have severe hyponatraemia. Echocardiography confirms a large left atrial myxoma. Hyponatraemia managed medically to facilitate general anaesthesia and surgery. The patient was referred for urgent excision of myxoma.
August 2021	Patient undergoes surgery 8 days after presentation. Hyponatraemia persists and recovers by Day 10 postoperatively. The patient is discharged on Day 11 of the postoperative period.
September 2021	Patient well at 6 weeks of follow-up.



Case presentation

Patient information

A 75-year-old Caucasian female patient was admitted to her local hospital with a short history of nausea, vomiting, confusion, drowsiness, and loss of consciousness resulting in a fall. Her past medical history included hypothyroidism and frequent palpitations. Two years previously she had a transient ischaemic attack of unknown aetiology.

Physical examination and diagnostic assessment

On examination, she was drowsy and disorientated. Her serum sodium level was 103 mmol/L (normal 135–145 mmol/L). Electrocardiography showed sinus rhythm. Further investigations for hyponatraemia revealed urine sodium of 92.5 mEq/L (normal <20 mEq/L), urine osmolality of 295 mOsm/kg (normal 50–1200 mOsm/kg), serum cortisol of 1390 nmol/L (normal <620 nmol/L), serum osmolality of 221 mOsm/kg (normal 280–290 mOsm/kg), suggesting Syndrome of Inappropriate Anti-Diuretic Hormone (SIADH) secretion. A computer tomography (CT) of her chest, abdomen, and pelvis was performed to exclude any malignancy causing the SIADH syndrome. The CT showed a large LA mass (5.7 × 3.0 × 4.0 cm) likely myxoma (Figure 1) and a benign ovarian cyst. An echocardiography confirmed the LA mass measuring 5.9 × 4.2 cm (area 28.8 cm²), a severely dilated LA (volume: 111.5 mL/m²; normal <34 mL/m²) and moderately dilated right atrium with preserved left ventricular ejection fraction (Figure 2). The presumed myxoma was found attached to the left inter-atrial septum (IAS) and not interfering with the mitral valve but almost filling the entire volume of the LA. Carotid ultrasound was unremarkable. Computed tomography angiogram showed unobstructed coronary arteries. She was referred for urgent excision of the AM. Due to the associated poor outcomes in hyponatraemic patients having general anaesthesia, she was initially optimized with medical management by fluid restriction and sodium supplementation. Her sodium levels gradually improved to 132 mmol/L a week later to allow surgery.



Figure 1 Computer tomography chest shows a large left atrial myxoma (arrow) occupying almost the whole of the left atrium.

Intervention

The myxoma was approached via a right atriotomy and incision of left IAS after establishment of cardiopulmonary bypass. It was found to be attached to the lower IAS and was excised with its inter-atrial attachment. The IAS defect was repaired using a bovine pericardial patch. The procedure and intensive therapy unit stay were uncomplicated. Postoperatively, she remained hyponatraemic with a serum sodium of 126 normalizing to 132 on Day 10. When she was discharged on Day 11, the echocardiography revealed mildly dilated LA size (volume: 50 mL/m²; [Figure 3A](#)), normal-sized right atrium (area: 17.9 cm²) with a preserved ejection fraction. There was no atrial septal defect noted.

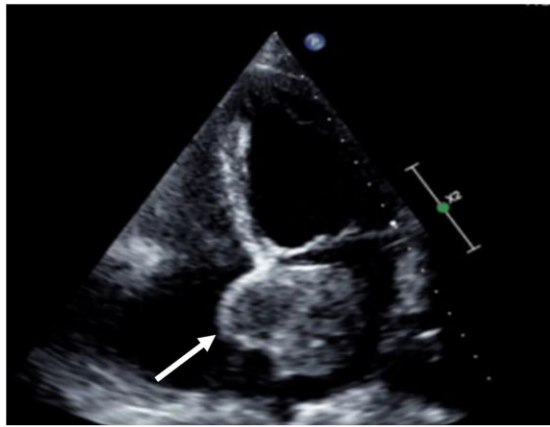


Figure 2 Echocardiography showing large left atrial myxoma (arrow) attached to the inter-atrial septum.

Follow-up and outcomes

Histopathology confirmed a completely excised benign cardiac myxoma measuring a maximum diameter of 70 mm. The patient remains well and symptom-free 6-week post-discharge.

Discussion

Patients with severe hyponatraemia (serum sodium <120 mmol/L) can present with neurological symptoms such as our case. Hyponatraemia can be classified as hypovolaemic [reduced extracellular fluid (ECF)], hypervolaemic (expanded intra- and ECFs), and euvolaemic (expanded intra- and ECFs without oedema).⁵ Extracellular fluid volume is influenced by the renin–angiotensin–aldosterone system (RAAS), renal sympathetic system, and salt excreting natriuretic peptide (NP) system. Atrial stretch causes a release of atrial NPs which inhibit the RAAS causing excretion of sodium and water by natriuresis from the kidneys^{5,6} and inhibits aldosterone directly causing further hyponatraemia.

Atrial myxomas can present with non-specific symptoms but hyponatraemia secondary to AMs is extremely rare. Dangerously low sodium levels, as in this case, can cause cerebral oedema associated with increased mortality in patients undergoing surgery.⁴

In our case, a very large AM caused dilatation and stretching of the atrial wall. This may have triggered the atrial NP system to excrete sodium and water from the kidneys⁴ causing hyponatraemia.

There have been two reports of left AM associated with hyponatraemia. Ramnarain and Mehra⁷ reported a case of a female patient with left AM presenting with hyponatraemia, hypovolaemia, and polyuria. The authors hypothesized, as in our case, the left AM mechanism of atrial overstretching leading to symptomatic hyponatraemia from ANP release. Interestingly, the hyponatraemia in their case also

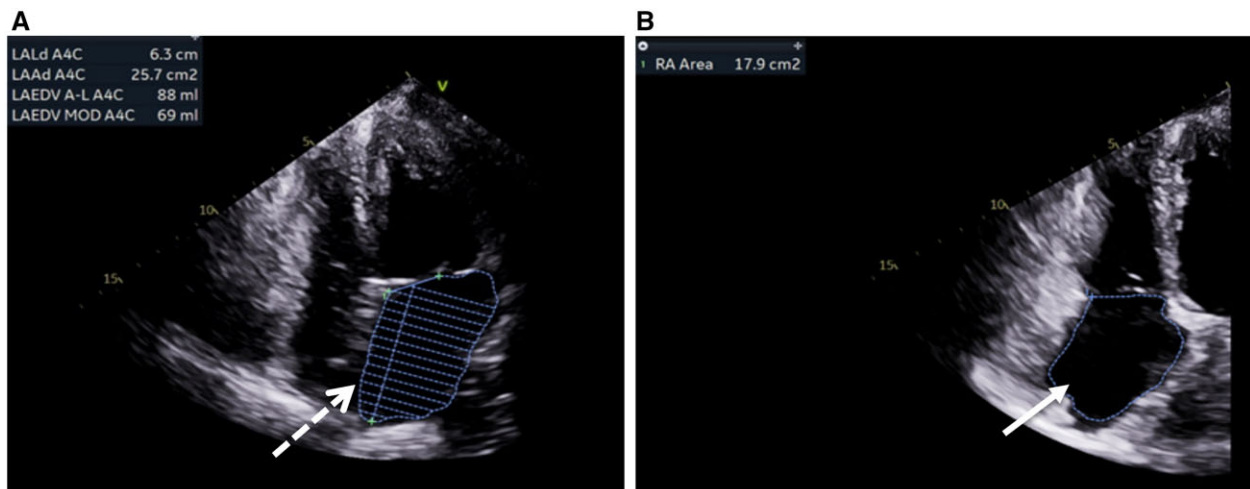


Figure 3 (A) Postoperative echocardiography demonstrating reduction in left atrium size (dashed arrow). (B) Postoperative echocardiography demonstrating a normal right atrium size (dashed arrow) and a patched intact inter-atrial septum (arrow).

recovered in the postoperative period resolving 10 days of post-surgical resection of the myxoma.

Andriessen *et al.*,⁸ on the other hand, describe a case of hyponatraemia following resection of AM (4.3 × 4.5 × 3 cm) in a female patient. The authors suggested that the atrial stretch during the surgical procedure or manipulation of myxoma results in release of ANP and subsequent hyponatraemia, although unlikely, as we would see more cases of hyponatraemia following surgery via left or right atrial approaches. Again, the patient's serum sodium levels gradually returned to normal 10 days postoperatively with echocardiography showing reduction in atrial dimensions.

Our case is the third report of a possible association between a large left AM, left atrial stretch, and hyponatraemia. All three reported cases affected females with recovery of serum sodium 10 days postoperatively following excision of AM.

Limitations

A natriuretic peptide level at the time of initial presentation and on discharge would have strengthened this hypothesis but unfortunately was not measured in our case.

Lead author biography



Srushti Bhat has completed her MD (Hons) and Postgraduate diploma in Medical Education and is currently working as a Clinical Fellow in Cardiothoracic Surgery at St. Bartholomew's Hospital, London. She has a keen interest in Surgery and Medical Education. She has been a proactive participator in conducting teaching sessions nationally and has presented at national and international conferences.

Supplementary material

Supplementary material is available at *European Heart Journal - Case Reports* online.

Slide sets: A fully edited slide set detailing this case and suitable for local presentation is available online as [Supplementary data](#).

Consent: The authors confirm that written consent for submission and publication of this case report including images and associated text has been obtained from the patient in line with COPE guidance.

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