

Staph What?: An Uncommon Species of Staphylococcus Endocarditis in an Atypical Case of Diabetic Ketoacidosis

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Abstract

- *Staphylococcus simulans* is a coagulase-negative staph species and is a well established animal pathogen.
- Reports of infection in humans is exceedingly rare with fewer than 100 cases involving any sort of infection with this species reported in current literature.
- We present a unique case of *Staphylococcus simulans* aortic endocarditis in a young male presenting with diabetic ketoacidosis.

Case

- 44-year-old male with a past medical history of insulin-dependent type 1 diabetes mellitus who initially presented due to a chief complaint of shortness of breath associated with pleuritic chest pain.
- Review of systems was otherwise unremarkable. Patient denied any nausea, vomiting, diarrhea, urinary urgency.
- Patient denied any similar symptoms in the past and denied any aggravating/alleviating factors.

Decision-Making

- Initial laboratory evaluation upon arrival reflected a non-calculable anion gap, elevated blood glucose, and large serum ketones. Patient was diagnosed with diabetic ketoacidosis and admitted to the ICU for further evaluation and management.
- Chest x-ray obtained on arrival was largely unremarkable (Figure 1).
- Upon arrival to the ICU, patient was initiated on an insulin drip. On hospital day 2, patient was noted to have frequent runs of supraventricular tachycardia with rates up to the 180's. Patient was given adenosine with termination of these rhythms.
- On hospital day 3, diabetic ketoacidosis had resolved and the patient was downgraded to the medical floors. The hospitalist team had planned to monitor for an additional night prior to discharging the following morning.
- On hospital day 4, patient was noted to have been spiking fevers as high as 103.1F prompting further evaluation. Blood cultures were drawn at this time. Patient was noted to be COVID-19 negative, a flu test was also obtained.
- On hospital day 6, patient was noted to be growing gram positive cocci in his blood cultures and was initiated on vancomycin. Of note, patient had no history of IVUD and had no obvious source of infection at this time.

Relevant Imaging Findings

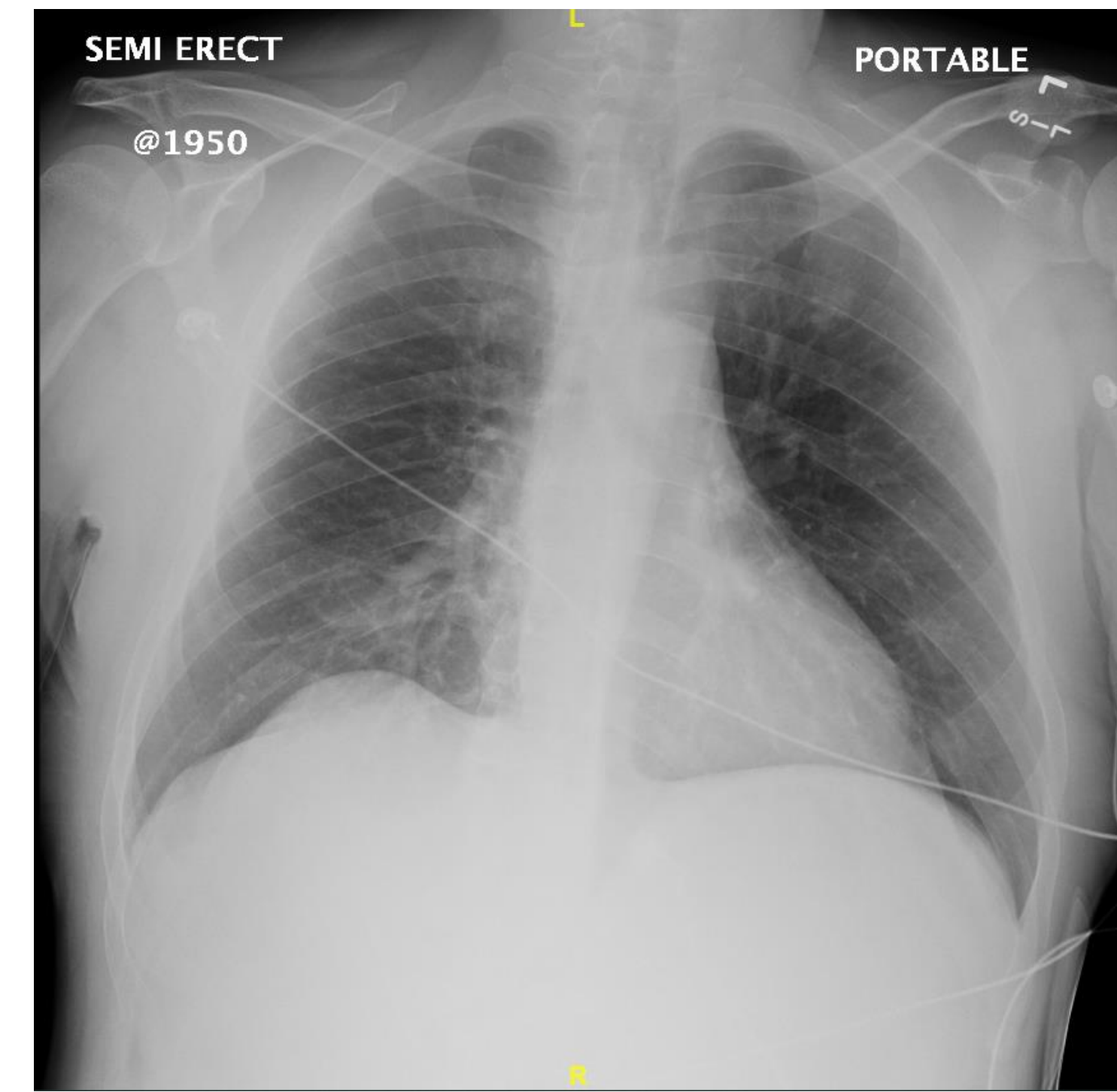


Figure 1: Chest x-ray on day of admission.

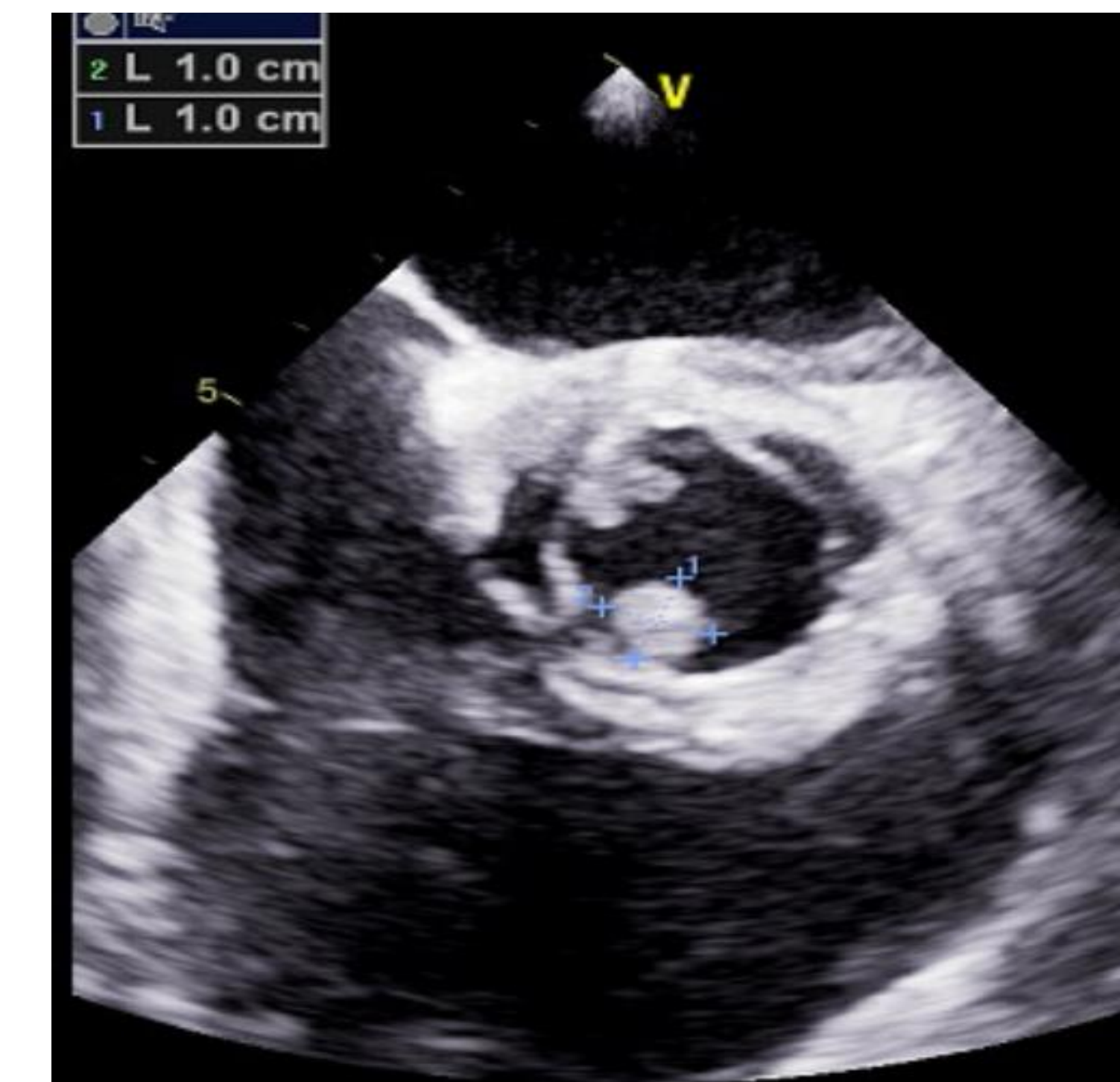


Figure 2: TEE showing aortic valve multilobulated vegetation measuring 1cm x 1cm

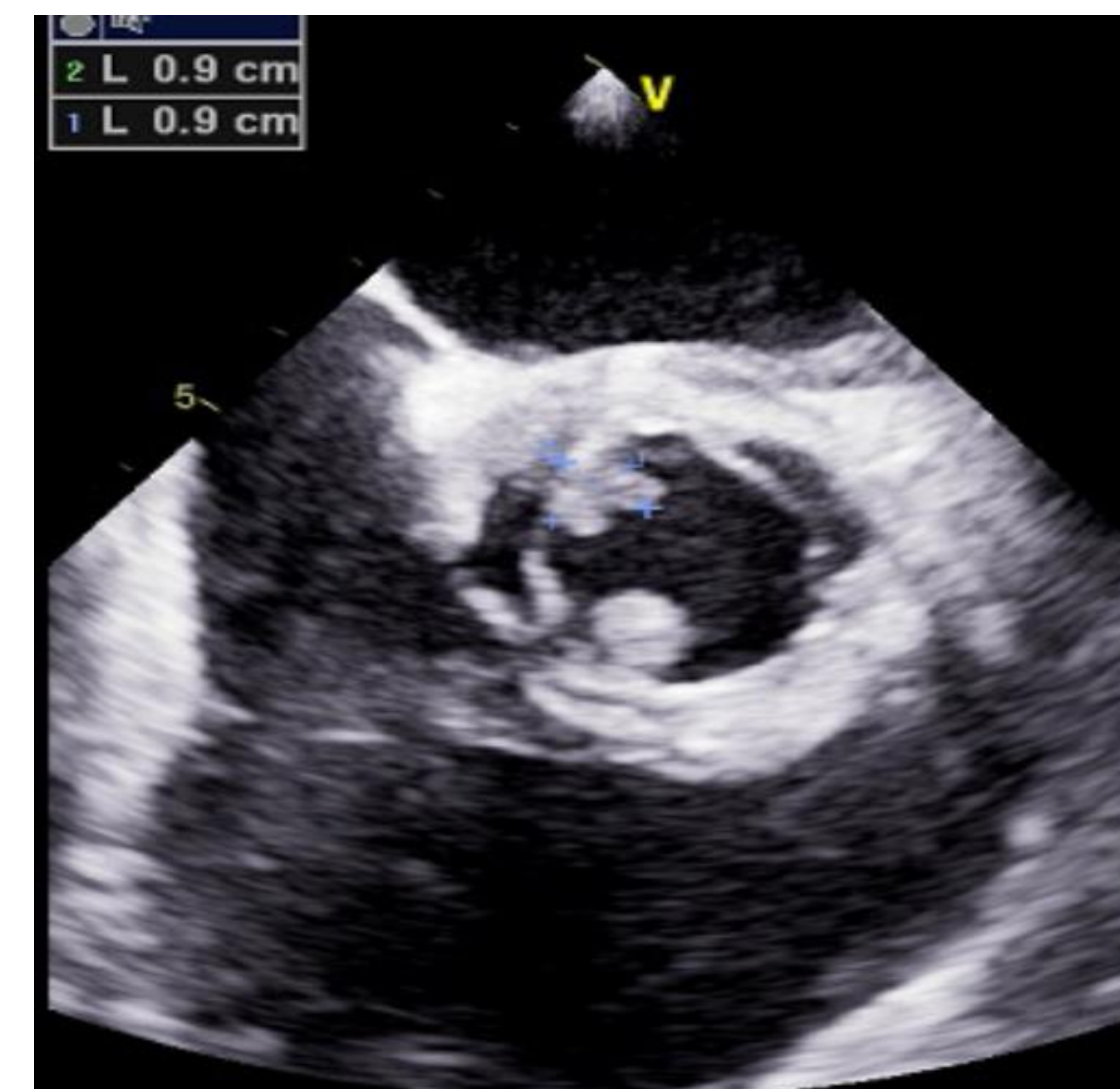


Figure 3: TEE showing aortic valve fixed vegetation measuring 0.9cm x 0.9cm

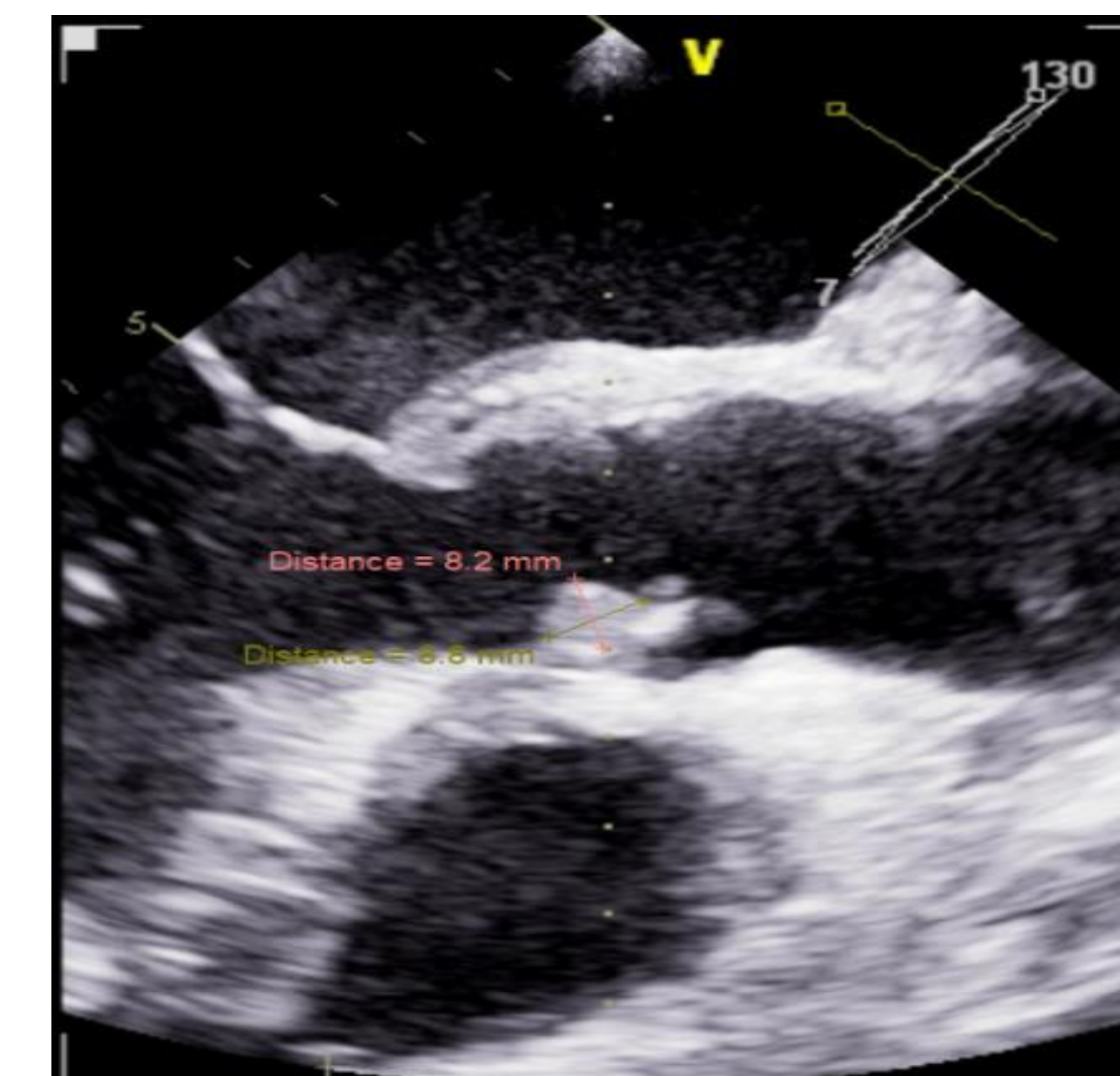


Figure 4: TEE showing vegetation



Figure 5: TEE showing aortic valve vegetation

Age/ Gender	Relevant Past Medical History	Valve Involvement	Surgery Required (Y/N)	Animal Exposure	Antibiotics used	Outcome
44/M	Previous episode of Diabetes Ketoacidosis, Diabetes Mellitus type 2, bicuspid aortic valve	Native aortic valve	N	Dogs and turtles in home	Cefazolin IV 2g for 6 weeks	Well at 1 month follow up
58/M	Previous aortic surgery, bicuspid aortic valve, alcohol misuse	Native aortic valve, native mitral valve, aortic root abscess	Y	Dogs in home, unsanitary conditions	Flucloxacillin 2 g four hourly B 4/52, Telicoplanin 600 mg BD, Gentamicin 3 mg/kg B 2/52	Death four days after prosthetic valve replacement surgery
46/M	Alcoholic liver disease, cirrhosis	Native mitral valve	N	Occupational-butcher	Vancomycin B 4/52, Telicoplanin B 5/12, Clindamycin PO added at 3/12	Well at two months
80/M	Aortic stenosis, bladder tumors, prostate cancer	Native aortic valve	N	None mentioned	IV Flucloxacillin 2 g 4-hourly initially, PO Flucloxacillin 500 mg six hourly day 26	Death at day 42 from presentation
64/M	Hep C cirrhosis, HTN	Native mitral valve	N	None mentioned	Daptomycin	Well at two months follow-up
56/M	Congenital VSD, Pulmonary valve fibrosis	Native aortic valve fibrosis no definite vegetations on TTE	N	None mentioned	Penicillin G, Gentamicin	Well at 1 year

Figure 6: Features of the published cases of *Staphylococcus simulans* infective endocarditis.

Decision-Making (contd)

- On hospital day 7, blood culture speciation returned for *Staphylococcus simulans*. Patient was initiated on the appropriate intravenous antibiotics.
- Given high suspicion for endocarditis in the context of the blood cultures speciation, a transesophageal echo was then performed. Results revealed a bicuspid aortic valve with a 1cm x 1cm multilobulated, mostly spherical, solid, fixed vegetation on the left ventricular aspect of the valve.
- Cardiothoracic surgery was consulted for further evaluation and recommended conservative management with an interval echo to be performed at a later date to reassess the need for surgical intervention.

Conclusion

- *Coagulase-negative Staphylococci* (CoNS) are responsible for 6–7% of native valve endocarditis.¹
- *S. simulans* is a rare cause of endocarditis. Excluding the case that we report, only five other cases of *S. simulans* endocarditis have been published to date.
- Despite its relative rarity as a cause of human disease, *S. simulans* is well-described as an animal pathogen. Has been reported to cause otitis externa in dogs.
- We postulate that our patient developed endocarditis due to living in close contact with a number of dogs in an unsanitary home and the history of bicuspid aortic valve.
- Of the 5 cases previously reported three patients had aberrant cardiac anatomy.

References

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