



Staphylococcal tricuspid valve infective endocarditis complicated by refractory sepsis and bilateral lung abscesses successfully treated with adjunctive mechanical aspiration

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A 33-year-old person who uses intravenous drugs presented with, dyspnea and altered consciousness. His initial laboratory investigations revealed severe lactic acidosis with a pH of 7.06, a serum lactate of 17.5 mmol/L, a c-reactive protein of 154 mg/L, a total white blood cell count of $42 \times 10^9/L$ and neutrophil count of $38 \times 10^9/L$. He was in frank disseminated intravascular coagulopathy (DIC) with a Hb of 5.4 g/dL, a platelet count of $38,000 \times 10^9/L$, an international normalized ratio of 4.5, activated partial thromboplastin time of 95.9 s and a fibrinogen level of 0.43 g/L. A lung contrast computed tomogram showed bilateral pulmonary emboli (Fig. 1) with RV strain and numerous bilateral parenchymal abscesses (Fig. 2). Large bulky tricuspid valve vegetations were seen on echocardiography with severe tricuspid regurgitation. Methicillin-sensitive staphylococcus aureus was isolated from blood cultures within 12 h of presentation. Despite intravenous cefazolin as directed by the sensitivity report, the patient remained septic and in refractory DIC, therefore, debulking of TV vegetations was undertaken using the AngioVac F22¹⁸⁰® system (AngioDynamics, Latham NY, USA).

Under general anesthesia with trans-esophageal echocardiographic guidance (Fig. 3, Supplemental videos 1 and 2), the device was introduced from the right femoral vein into the right atrium. A 17Fr re-infusion cannula was secured in the left femoral vein. The circuit was connected to an extracorporeal centrifugal pump. The majority of the bulky vegetations (Fig. 4) were extracted after a 10-minute pump run with

flow rates of up to 5.2 L/min (Supplemental video 3).

The patient improved within 48 h of the procedure. Repeat blood cultures were sterile and his coagulation profile, inflammatory markers and total white cell and absolute neutrophil count also normalized. He was maintained on intravenous cefazolin for 10 days then discharged on oral co-trimoxazole for an additional 32 days. He successfully completed a total of 6 weeks of antimicrobial therapy. The patient has had no relapses and will be evaluated for tricuspid valve surgery after a comprehensive rehabilitation program.

Large-bore Percutaneous mechanical aspiration (PMA) has bridged a huge gap in the acute management of patients with tricuspid valve endocarditis. The response to parenteral antimicrobial drugs alone is unpredictable due to persistence of bulky, immune-evasive infected vegetations, and distal embolization seeding new septic foci in the lung parenchyma [1]. Such cases classically require surgical intervention. On the other hand, surgery in infected friable tissue in a coagulopathic, bacteraemic subject with concomitant right ventricular (RV) dysfunction is fraught with substantial perioperative risk, especially of early prosthetic valve endocarditis. In summary, PMA provides early source control and limits valve destruction. Definitive surgery, if still indicated, can be planned under more favorable circumstances [2].

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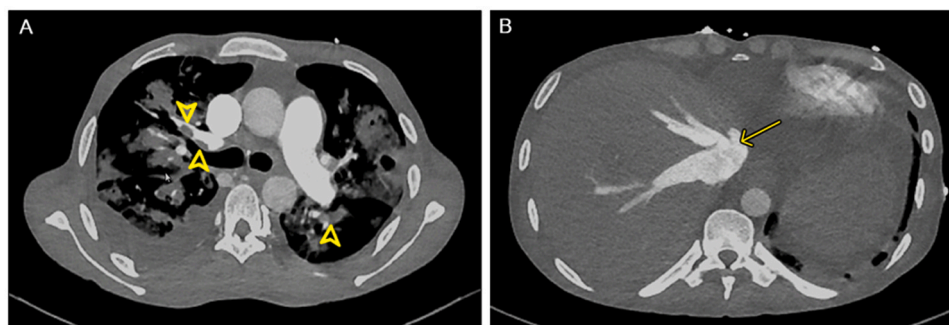


Fig. 1. A CT pulmonary angiogram at a level below the tracheal carina showing (A) markedly dilated main and branch pulmonary arteries. Multiple filling defects are seen within the distal pulmonary arteries bilaterally (arrow heads). (B) Contrast reflux into the dilated hepatic veins (arrows) consistent with severe tricuspid regurgitation.

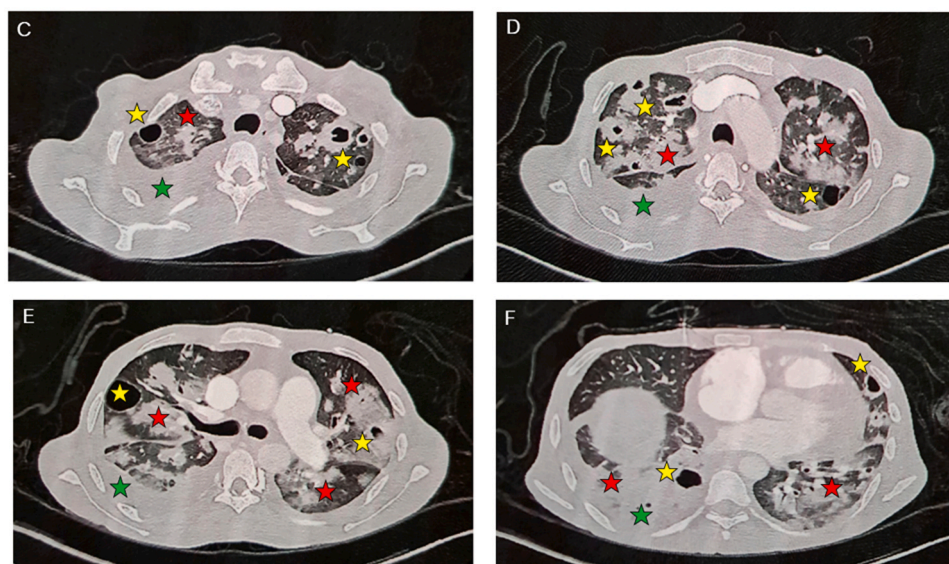


Fig. 2. High resolution CT of the lungs progressing from apex [C] to diaphragm [F] showing a moderate right sided pleural effusion (green asterisk), multiple ring-enhancing cavitary lesions consistent with abscesses (yellow asterisk) and patchy consolidation affected multiple lung segments bilaterally (red asterisk).

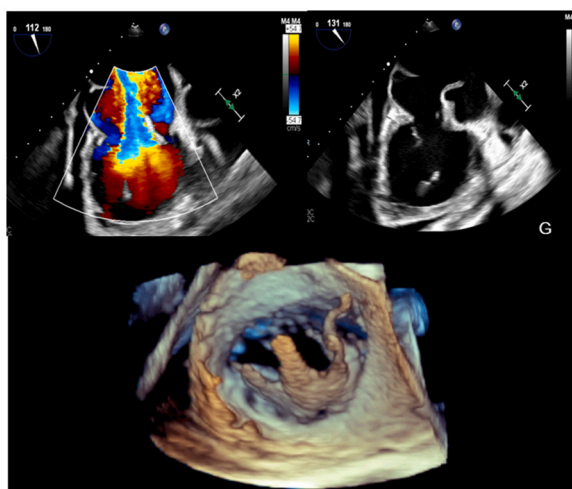


Fig. 3. Modified mid-esophageal right ventricular inflow view showing severe tricuspid regurgitation with multiple vegetations attached to the valve leaflets [21 × 8 mm on septal leaflet and 36 × 5 mm on posterior] with a particularly large [44 × 7 mm], multi-lobulated and highly mobile vegetation attached to the anterior leaflet of the tricuspid valve (3D reconstruction).

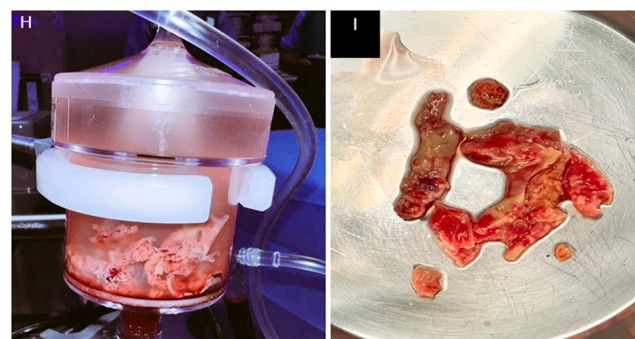


Fig. 4. Large chunks of vegetations extracted with the AngioVac® F-180 system [I] The aspirated vegetations contained purulent debris.

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Author Statement

Authors testify that they have no competing conflicts of interest to

disclose. All authors have contributed significantly to this manuscript and to the case as a whole and all vouch for the accuracy of the data included. Authors also confirm that no form of Artificial Intelligence (AI) was used to generate any images or write any component of the manuscript being submitted.

CRediT authorship contribution statement

Ahmed Shams: Data curation. **Hatim Al Lawati:** Writing – original draft, Supervision, Data curation, Conceptualization. **Kamla Al Wuhaibi:** Writing – original draft, Supervision, Data curation. **Zsolt L. Nagy:** Supervision. **Ahmed Redha Baqeri:** Supervision. **Mohammed Gamal El Hadad:** Data curation.

Declaration of Generative AI and AI-assisted technologies in the writing process

No AI-assisted tools were used in the preparation of this manuscript or in image processing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Consent Statement

Consent was obtained from the patient for publication of this report and the accompanying images.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.idcr.2024.e02092](https://doi.org/10.1016/j.idcr.2024.e02092).

References

- [1] El Sabbagh A, Yucel E, Zlotnick D, Moriarty JM, Younes S, Hamid N, et al. Percutaneous mechanical aspiration in infective endocarditis: applications, technical considerations and future directions. *J Soc Cardiovasc Angiogr Interv* 2024;3(4):101269.
- [2] Mhanna M, Beran A, Al-Abdoun A, Jabri A, Sajdeya O, Al-Araj A, et al. AngioVac for vegetation debulking in right-sided infective endocarditis: a systematic review and meta-analysis. *Curr Probl Cardiol* 2022;47(11):101353. <https://doi.org/10.1016/j.cpcardiol.2022.101353>.