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Case Report

Nightmare with Interventional Sinus Venosus Atrial Septal Defect Closure: Surviving the Storm

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INTRODUCTION

Sinus venosus atrial septal defects (SVASDs) present unique challenges for percutaneous closure. The use of covered stents has emerged as a promising technique; however, complications such as stent migration can occur. We report a case of successful transcatheter closure of an SVASD using a covered stent, which migrated from the balloon and was successfully retrieved using snaring. The patient remained hemodynamically stable, and the final outcome was excellent.

KEYWORDS

Sinus Venosus Atrial Septal Defect, Covered Stent, Stent Migration, Snaring, Transcatheter Closure

INTRODUCTION

The sinus venosus atrial septal defect (SVASD) first described by Peacock in 1858 and it represents 5 to 10% of atrial septal defects [1]. Surgical closure of the defect remained the treatment of choice until a novel transcatheter method of sealing the defect with balloon expandable stent in 2014 by Garg et al. [2]. Sinus venosus atrial septal defects (SVASD) are rare congenital cardiac anomalies that traditionally require surgical repair. However, percutaneous techniques using covered stents have been increasingly reported [3]. One of the challenges associated with this approach is stent migration, which can lead to significant complications [4]. This case highlights the successful retrieval of a migrated stent using snaring, followed by successful defect closure.

CASE PRESENTATION

A 50 years old female, a known case of bronchial asthma in the past, treated for long time with pulmonologist. She

was referred to us for dyspnoea on exertion for 6 months. On cardiac evaluation recently underwent TTE and suspected as Sinus venosus defect. TEE confirmed the same (Large SV defect with PAPVC). She was evaluated with Cardiac CT scan for delineation of pulmonary veins and further planning (Figure 1a & 1b).

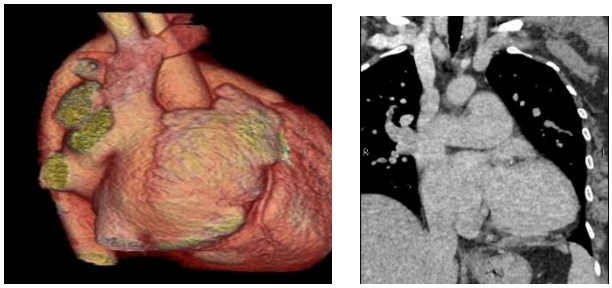

Figure 1a, 1b: CT Images showing SVD, PAPVC.

The decision was made to attempt transcatheter closure using a covered stent under general anaesthesia During cardiac catheterization, the left-to-right shunt ratio was 2.0, and the mean pulmonary artery pressure, was 38 mmHg. Interrogation with a *34mmX70mm Amplatzer sizing balloonII* (AGA Medical corporation, USA) across the cavoatrial junction showed complete closure of the SVD.With balloon inflated, right upper pulmonary venous (RUPV) angiogram done (access from opposite femoral vein after doing septal puncture) which confirmed unobstructed redirection of the RUPV to the left atrium (Figure 2a & 2b).

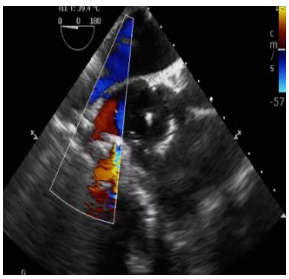

Figure 2a: RUPV angiogram. Figure 2b: Complete occlusion of SVD.

After this step we progressed further and since SVC was grossly dilated, to provide a sufficient anchor, two overlapping stent strategy was planned. Initial anchoring bare metal stent- *ZephyrXL19-25mm x34 mm were mounted on a 24 mm × 75 mm BIB balloon* (NuMED Inc, Hopkinton, NY) and deployed (Figure 3, 4).

Figure 3: Successful deployment of bare metal stent. **Figure 4:** Displaced Covered stent from Balloon.

After this while we were taking *Zephyr CS 19-25mmX65mm stent on Vector LD 28mm x 60mm balloon*, the nightmare started. It was noticed that the stent was displaced from the balloon. To add more to the problem next issue happened, that sheath got completely pulled out of puncture site with stent balloon assembly there in situ (Figure 5)**.**

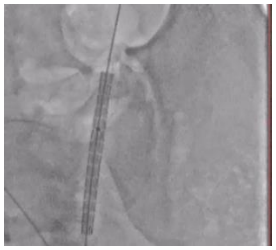

Figure 5: Sheath out from groin puncture site.

With no option of reinserting the wide bore delivery sheath without dilator, sheath was cut and torn with the scalpel externally. Now, with only displaced stent over balloon assembly was tracked bare without delivery sheath up to right atrium. Rescue mission started with attempt to snare and reposition the stent from left internal jugular vein (LIJV) (Figure 6). A snare catheter was introduced via a left internal jugular approach, and after several attempts, the migrated stent was successfully retrieved and repositioned. Once the correct positioning was achieved, stent was deployed. Post-deployment angiography confirmed satisfactory closure of the defect without residual shunting or obstruction (Figure 7, 8).

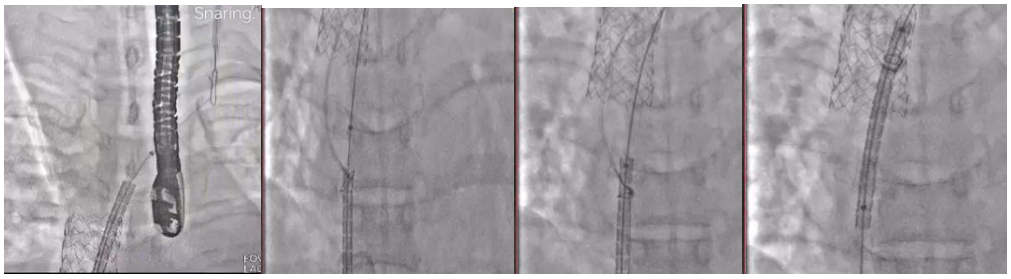

Figure 6: Demonstration of steps of snaring, holding and finally pulling back to correct position on balloon.

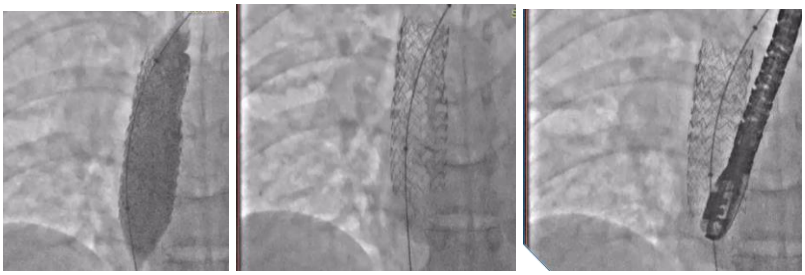

Figure 7: Stent deployment.

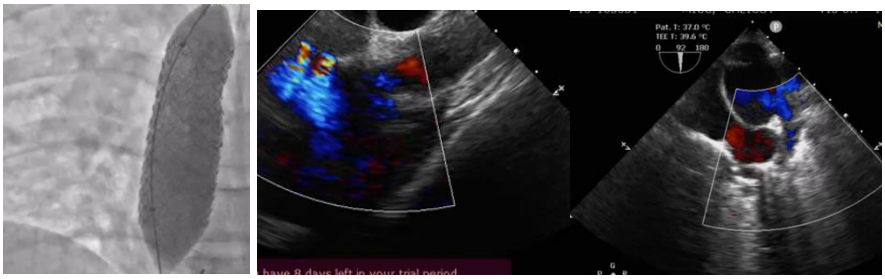

Figure 8: Post dilatation of stent, no residual SVD.

The patient remained hemodynamically stable without any signs of obstruction and she was discharged after 4 days of procedure.

Outcome and Follow-Up

The patient tolerated the procedure well, with no immediate complications. Post-procedure echocardiography demonstrated an adequately placed stent with resolution of the shunt. The patient was discharged on dual antiplatelet therapy and remained asymptomatic at follow-up.

DISCUSSION

Covered stents have become an effective option for SVASD closure, particularly in patients with anomalous pulmonary venous drainage [5,6]. Recent years has witnessed more use of transcatheter closure of sinus venous ASD which is attributed to multiple factors, especially due to better understanding of anatomy and advancement in the imaging techniques [7-9]. Most of the cases after assessment by TEE were deemed fit for transcatheter closure in adults unless the defect is high up in the SVC. Most common complications after stenting are stent migration, thrombosis, and misplacement [10]. Choosing appropriate stent length is utmost important once balloon interrogation is over. However, stent migration remains a potential complication. This case highlights the importance of immediate recognition and prompt management of migration using snaring techniques, which allowed for successful repositioning and defect closure without surgical intervention.

CONCLUSION

Transcatheter closure of SVASD using a covered stent is a feasible alternative to surgery. Although stent migration can occur, it can be effectively managed with endovascular retrieval techniques, ensuring excellent clinical outcomes.

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