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Vascular Access Stent Migration in a Patient with Atrial Fibrillation – A Case Report

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Abstract

Atrial fibrillation (AF) is a relatively commonly encountered tachyarrhythmia, with its prevalence increasing with increase in age. AF is usually associated with an underlying cardiac disease, but transient AF has also been reported from mechanical stretch and compression. However, to our knowledge, there are no reports of vascular stent migration to intra-cardiac cavity causing AF. We present a case of endovascular stent migration into the cardiac cavities which could have triggered the AF in presence of other risk factors.

Keywords: *Atrial Fibrillation, Stent migration, Strut fracture.*

Introduction

Atrial fibrillation (AF) is a relatively commonly encountered tachyarrhythmia, with its prevalence increasing with increase in age. AF is associated with an underlying cardiac disease, heart failure and atrial enlargement. The common cardiac disorders associated with AF are ischemic heart disease, valvular heart disease, dilated cardiomyopathy, hyperthyroidism, alcohol abuse etc. Transient AF has also been reported to be caused by mechanical stretch and compression, such as with esophageal cancers, post esophageal surgery. [1]

Intracardiac migration of dislodged venous stents is a rare but serious complication of radiological intervention [2], with a reported incidence of about 3%. [3] However, to our knowledge, there are no reports of vascular stent migration to intra-cardiac cavity causing AF. We present a case of intracardiac migration of an endovascular stent in a patient on maintenance hemodialysis, who presented with new onset AF.

Case Report

A 43-year-old woman who had been undergoing maintenance hemodialysis for last 2 years due to chronic kidney disease (presumed chronic glomerulonephritis) was admitted with severe edema in her right arm, which had an arterio-venous graft, created 2 months back. She had history of multiple vascular access issues in the past. Approximately 1 month earlier, a 10x50mm Wallstent was placed in her right basilic vein after an angiogram revealed a >80% diameter stenosis that was compromising her graft. The stent was deployed successfully and the procedure was tolerated well.

She presented with unilateral swelling of the neck, face, and right arm. She complained of general fatigue and had atrial fibrillation with shock (60mm Hg systolic BP). A possibility of septic and cardiogenic

shock was considered. Her electrocardiogram showed atrial fibrillation with fast ventricular rate. She also had volume overload with pulmonary edema, however dialysis was deferred due to hemodynamic instability, and non affordability for CRRT. She was started on antibiotics, inotropes, amiodarone and mechanical ventilation. On lab investigations, she had uremia with normal electrolytes and metabolic acidosis. A chest X-ray was done, which showed presence of a cylindrical object in the right ventricle and superior venacava, suspicious of a metallic stent (Figure 1). The object had multiple struts, and also had strut fracture (type 2) at the upper end (Figure 2). Her echocardiogram showed tachycardia, dilated right atrium, mild pulmonary hypertension, and a pipe-shaped structure with multiple slit and acoustic shadow in right ventricle. We did not select surgical removal of the venous stent because she had complications with renal failure and severe left ventricular dysfunction with refractory shock. Percutaneous procedure was planned but deferred in view of strut fracture. Patient was initially managed conservatively, but succumbed 8 hours after admission with refractory shock. A possibility of cardiogenic shock and also septic shock (possibly infected stent with infective endocarditis) was considered.

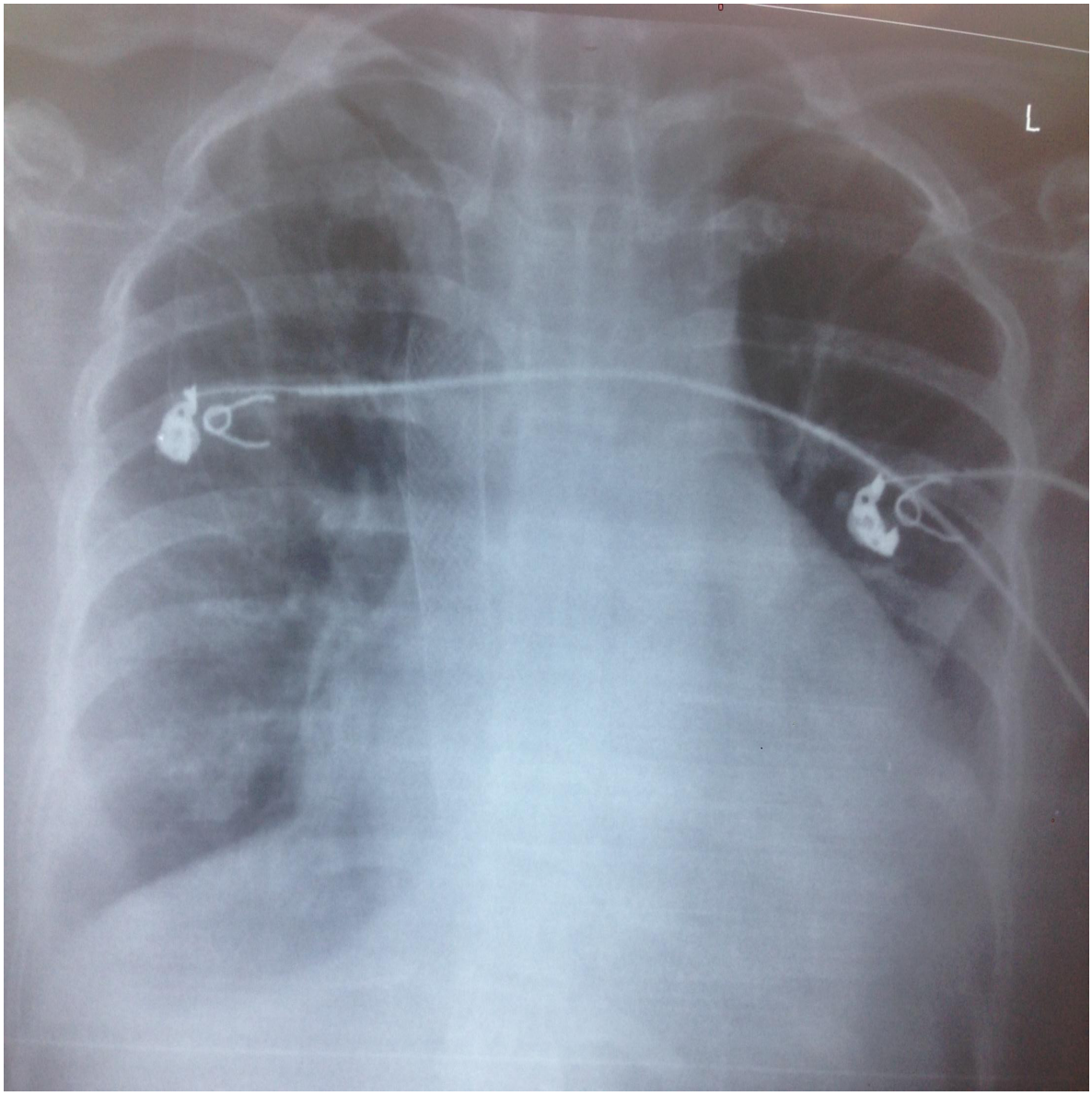

Figure 1. *Chest X-ray AP view showing migration of the endovascular stent.*

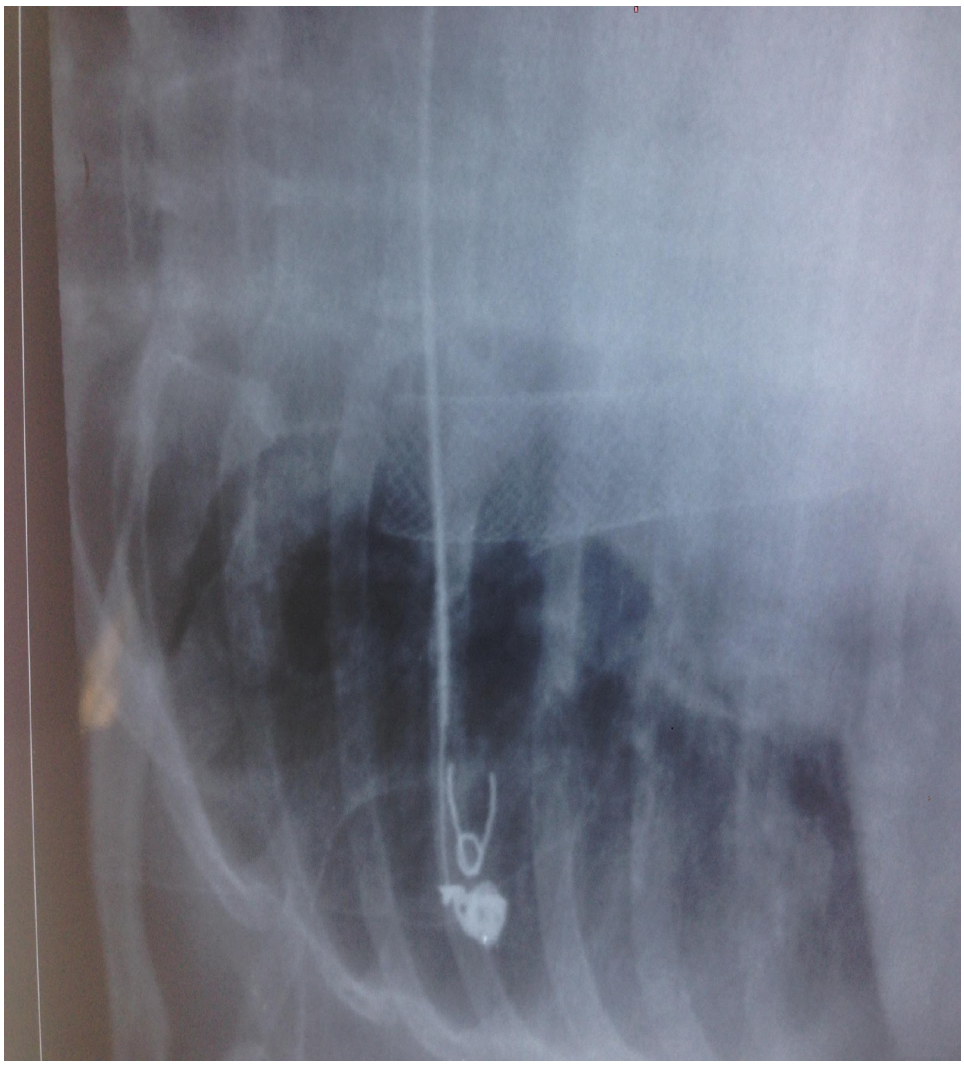

Figure 2. *Closer view of Figure 1, showing presence of strut fracture*

Discussion

The reported incidence of stent migration complicating endovascular procedures is as low as 3%.[4] Various factors have a role in determining the risk of stent migration like, the location and size of lesion, the technique used for deployment, the size of the stent and external vascular trauma. The size of the selected stent is one of the major factors linked to stent migration. The stent diameter should be greater than diameter of the vein planned for deployment, compensating for neointimal growth and also preventing migration of the stent. [5]

The risk of AF increases in patients with Hypertension, with a relative risk of 1.9 and 3.0 in those with and without hypertension respectively. [6] Therefore, the risk of AF is modestly increased due to anemia in our patient who had a structurally normal heart on echocardiogram prior to this episode. To our knowledge, AF in association with stent migration has not been reported previously. In our case, the mechanical stretch caused by the migrated stent and the local inflammation, with possible sepsis might have been the plausible mechanism for initiation of AF. On the other hand, anemia of chronic kidney disease and systemic sepsis may act as aggravating factors. AF has been previously reported to be precipitated by Left atrial compression. A case of mega-esophagus precipitating AF has been reported, and the external compression of the left atrium was proposed to be the likely mechanism. [7] Another case of AF has been reported in a patient with intra pericardial lipoma which caused left atrial compression. [8]

In our patient, AF may have been triggered by the mechanical stimulation from a possible automatic focus located in the posterior wall of the right atrium which may be more excitable with mechanical stimulation. This could have been confirmed by electrophysiological studies, but however we were unable to perform such studies due to hemodynamic instability.

Percutaneous endovascular stent retrieval has been the first line approach for removal of migrated stents. Various techniques are available, including loop snares, pigtails, forceps, baskets, balloon catheters etc. Percutaneous procedures are usually recommended before planning a surgical approach. However, in our patient this could have been hazardous because of presence of strut fracture and size of the migrated stent. Therefore, surgical opinion was sought and open thoracotomy was considered. However, surgical procedure was deferred as patient was hemodynamically stable with presence of refractory shock.

Conclusion

Migrated stents are a rare complication of vascular access interventions, and they must be removed as soon as possible. If left in situ, they may lead to serious complications like formation of a thrombus, embolization, infection and endocarditis, and can also cause myocardial damage, arrhythmias, myocardial perforation and cardiac arrest.

There are many options available for removal of migrated stents, and percutaneous transluminal retrieval is considered the method of choice. The appropriate choice depends on the stent characteristics like its length, diameter, strut fracture, and the site of migration, availability of the required devices, operator experience, and the vascular anatomy.

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