Case Report

Traumatic Left Subclavian Artery Branch Injury Presenting as Hemopneumothorax

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Abstract

Permanent pacemaker implantation is often times a very safe procedure, with early complication rate of 4-5% and late complication rate of 2.7% depending on the annual volume of procedures performed by the clinician. We present a case of an 84 year old female with left sided hemopneumothorax discovered hours after insertion of a permanent pacemaker. The patient initially presented with chest pain and 2nd degree AV block on EKG. Dual chamber pacemaker was inserted through the subclavian approach after failure of the axillary approach. The patient became hemodynamically unstable postoperatively with chest x-ray revealing a left hemopneumothorax with a large pleural effusion. Subsequent angiography revealed a bleeding small branch of the left subclavian artery. While multiple complications of pacemaker insertion have been described, hemopneumothorax as a result of subclavian artery branch injury is a rare complication through the subclavian vein approach.

ABBREVIATION

AV block: Atrio Ventricular block; EKG: Electrocardiogram

CASE PRESENTATION

The patient is an 84 year old female with past medical history of hypertrophic cardiomyopathy (HOCM) and hypertension who presented to our emergency room with a one day history of intermittent chest pressure and tightness. Initial EKG revealed Mobitz type II 2nd degree AV block. Subsequently, the patient was medically stabilized and transferred to the cath lab. Cardiac cath revealed normal coronaries, and HOCM. During the procedure, the patient was noted to have a positive Brockenbrough-Brownwald-Morrow sign, which indicates severe left ventricular outflow obstruction. Left ventricular stimulation resulted in asystole and thus, transcutaneous temporary pacemaker was initiated (Figures 1,2). The patient was offered alcohol ablation or myomectomy as treatment options. Both patient and family declined these procedures. Thus, permanent pacemaker placement was indicated. Pacemaker placement through the axillary approach was attempted unsuccessfully due to increased resistance. The subclavian vein approach was attempted and the pacemaker was put in place successfully. Three hours postoperatively, patient became dyspneic, and hypotensive. The patient had no response to fluid resuscitation and was subsequently started on pressors. Repeat chest x-rays revealed left sided apical pneumothorax with large left sided effusion. Urgent left sided thoracostesis was performed with an output of 800 mL of sanguinous fluid. Due to the high volume of output, a chest tube was placed with an initial output of 1.5L of blood. Urgent angiogram was performed revealing a small bleeding vessel near the left subclavian artery. The vessel was embolized and a 3mm x 5cm coil was placed within the branch vessel. Furthermore, the patient required multiple PRBCs, FFP and platelet transfusions. Several days later, the patient stabilized and was transferred to sub acute rehab (Figures 3,4).

DISCUSSION AND REVIEW OF LITERATURE

This case demonstrates hemopneumothorax, a rare complication of permanent pacemaker insertion, from injury to a small branch of the left subclavian artery. Common complications of pacemaker placement from subclavian vein puncture include pneumothorax, hemothorax, lead fracture, and 'Subclavian crush' syndrome [1] (Figure 5). In our case the exact mechanism of injury is believed to be a result of arterial branch laceration during the subclavian puncture. Arterial injury during pacemaker placement has been reported to result from vascular access damage, as well
In our case, access via the axillary vein was initially attempted but was unsuccessful. Results from a randomized controlled study comparing the axillary and subclavian approaches demonstrate that the axillary approach to be safer due to its anatomical placement; axillary puncture avoids nerve and pleural injury, as well as subclavian crush syndrome [5]. After the axillary approach was unsuccessful, the subclavian approach was attempted. Advantages of the subclavian approach as opposed to alternative methods include ease of access, the less invasive nature, and utility in that the vein may be used repeatedly should changes or revisions of the pacemaker be deemed necessary [3]. A study by Kotter et al., reviewed the records of 1264 patients, comparing axillary venous vein approach versus subclavian vein approach. Of the 879 patients that underwent subclavian vein approach, 21 (2.4%) were found to have a pneumothorax and 0% through the axillary approach. The choice of vein access was found to be the strongest predictor of developing a pneumothorax [6,7] (Figure 7). Kirk and Turner compiled a ten year review of 628 procedures involving permanent cardiac pacemakers, of this 97% were done with subclavian venous access with hemothorax rate of 0.9% [8-10].

CONCLUSION

For permanent pacemaker placement, the axillary vein as from lead placement [2]. Molnar et al., presents a case in which the subclavian artery was injured via puncture and dilation with 9 French dilator [3]. Kypson et al., describes a case in which the left internal thoracic artery was injured during a transvenous insertion of a pacemaker. However, in their case they reported injury secondary to lead implantation through the pericardium into the left internal thoracic artery. Thirty-six hours later, the patient presented in respiratory distress with left-sided chest pain. Consequently, a detached lead was found to be the cause of bleeding [4] (Figure 6).
approach is preferred to minimize complications. If the subclavian vein approach is used, further caution should be taken to reduce adverse outcomes.

REFERENCES


