

Open abdominal surgery for migration of patent ductus arteriosus occluder device

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Although percutaneous interventions have been increasing for closure of patent ductus arteriosus, there may be situations where procedure-related complications are encountered and surgical help is required. In this article, we present a five-year-old girl in whom an Amplatzer duct occluder was first dislodged into the descending aorta and then into abdominal aorta. The device was removed through open abdominal surgery by temporarily occluding the aorta.

Keywords: Abdominal aorta; ductus arteriosus; transcatheter closure.

Although satisfactory results have been obtained in the closure of small ducts (<2 mm using detachable coils), there is a higher incidence of residual shunt, hemolysis and embolization in larger ducts.^[1] In 1998, Masura et al.^[2] published the first series of cases of percutaneous closure of the arterial duct by using the Amplatzer device, which was specifically designed for medium to large ducts. Complications related to the percutaneous closure of patent ductus arteriosus (PDA) by using an Amplatzer duct occluder (ADO) are rare. However, procedure-related difficulties may lead to severe complications. In this article, we report a case of PDA device embolization into abdominal aorta which was removed successfully through open abdominal incision, a rare surgical approach for this complication.

CASE REPORT

A five-year-old girl was referred to the Department of Cardiac Surgery with the diagnosis of a large PDA (3.5-4 mm diameter, 2.2 mm length) and descending aorta embolization as a consequence of implant migration after failed percutaneous closure with the ADO I (8/6 mm). After deployment of the device, the fluoroscopy confirmed that it was dislodged into the juxtaductal descending aorta improperly (Figure 1). Several attempts by catheter retrieval failed. The girl was eligible for a surgical procedure of PDA closure with simultaneous minimally invasive removal of the implant via median sternotomy. Median sternotomy was performed in the operating room and careful dissection was carried out around the aorta, pulmonary artery and PDA. Intraoperative heparin was administered to

reduce the risk of thromboembolization. The device was not felt in the aortic edge of PDA. Preoperatively monitored femoral pulses became feeble. Then, PDA was immediately closed with double ligation. Repeated fluoroscopy showed that the occluder device was located at the bifurcation of abdominal aorta. After an abdominal incision, the device was held with artery forceps and removed from abdominal aorta (Figure 2). Postoperative period was uneventful.

DISCUSSION

Technological advances in interventional transcatheter closure of PDA provide simple and routine techniques with shorter hospital stay, less mortality and morbidity rates.^[3] Moreover, it also reduce surgical risk factors and inevitable operation scar of surgery. Since it was first described by Porstmann et al.^[4] in 1967, variable devices have been introduced into the clinical practice. Gianturco and Cook detachable coils have been proven both safe and effective in closure of small to moderate size of PDAs,^[5] while ADO device and Nit-occlud® device have been developed to meet relatively favorable outcomes in moderate to large PDAs.^[6] However, the procedure is not free of complications, which may include residual shunt with or without hemolysis, protrusion or migration of the device into aorta or pulmonary artery, endocarditis,

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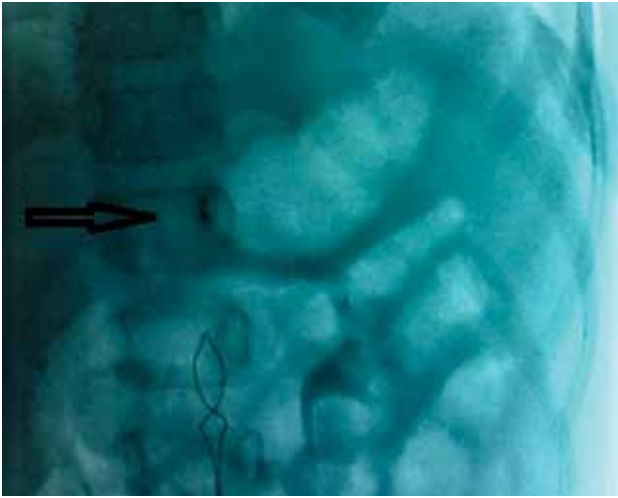


Figure 1. Angiography showing migrated device in juxtaductal descending aorta.

thromboembolization and wire fracture or device disruption.^[7] Major complication risk is almost 10% in some studies.^[8] Embolization of the device has been identified as one of the most significant complications of intervention.^[9] It may occur in unexpected sites of circulatory system and cause serious damage. In the present case report, the device was first embolized into the descending aorta and then into the abdominal aorta.

Immediate surgical intervention to remove migrated device is indicated in patients who are hemodynamically unstable. Even in patients who are hemodynamically stable, immediate surgical intervention is preferred, as it facilitates the removal of the device before embolization. Most of the surgical attempts to remove those devices which migrated into descending aorta are done through median sternotomy with or without the aid of cardiopulmonary bypass. In our case, we initially performed median sternotomy to remove the partly dislodged device from juxtaductal descending aorta; however, we were unable to reach, due to the remigration of the occluder into the abdominal aorta. Therefore, we performed an abdominal incision.

In conclusion, percutaneous closure of ductus arteriosus is a safe and effective alternative to surgery, however, complications may be seen in those with unfavorable duct anatomy. Possible mismatch between implanted occluder size and anatomical PDA diameters could be the reason for the

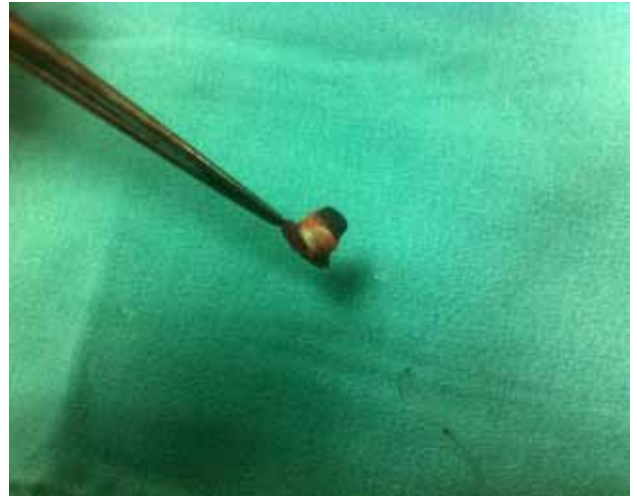


Figure 2. Occluder device removed by open abdominal surgery.

phenomenon of PDA underestimation and subsequent complications. Surgical back-up is also important for such interventional procedures. Although rarely seen, re-migration of migrated devices may occur and open abdominal surgery may be required as a life-saving emergency procedure for device retrieval.

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