Transaxillary Intra-aortic Balloon Pump Placement: A New Approach With Great Potential

To the Editor: The intra-aortic balloon pump (IABP) was initially developed for management of cardiogenic shock in the setting of acute myocardial infarction.[1] Over ensuing years, the IABP became a therapeutic strategy for bridging critically ill patients to left ventricular assist device (LVAD) implantation or heart transplant. Because of the nature of femoral access, prolonged use of an IABP has been associated with infection, peripheral artery complications, and restricted patient mobility. Therefore, the IABP oftentimes is removed after a few days of insertion, which deprives patients of prolonged mechanical hemodynamic support. Percutaneous transaxillary access has evolved as an alternative approach for prolonged mechanical hemodynamic support as a bridge to target therapy. Additionally, in many centers, the transaxillary approach for placement of the IABP has been the primary access for patients with occlusive peripheral artery disease.

The first IABP placement via axillary artery was performed in 1989 by McBride et al,[2] who used a simplified surgical technique for IABP placement. A Dacron side-arm graft or vein cuff is used as a conduit to avoid trauma to the axillary artery and to facilitate decannulation by simply transecting the graft.[3] Currently, transaxillary access can be obtained percutaneously under sonographic guidance, which is less invasive and does not require general anesthesia. Once access is obtained, the sheath is inserted to cannulate the left axillary artery. The advancement of the IABP through the axillary sheath can be performed under fluoroscopic guidance until the distal end of the catheter is positioned in the proximal abdominal aorta just above the ostia of renal arteries.

Patients presenting with decompensated end-stage heart failure often require urgent placement of an LVAD as bridging or destination therapy. However, because of multiple comorbidities such as active bleeding, previous sternotomy, acute kidney injury, or ongoing infection, LVAD implantation is often delayed.[4,5] Thus, the transaxillary approach for IABP placement has evolved as an alternative access that provides prolonged hemodynamic support without interfering with early ambulation and physical therapy.[4,5] Umakanthan et al[5] described a series of 18 patients who underwent transaxillary IABP placement as a bridge to heart transplant (median of 19 days). The IABP was placed successfully through the left axillary artery in all patients with no reported IABP-related vascular or embolic complications. Three patients required IABP replacement because of device migration, kinking, and rupture without any further complications. There was marked improvement in ambulatory potential, and the longest distance walked in a day was 2654.58±2425.52 feet compared with 411.4±247.7 feet before IABP placement (P=.008). In a large retrospective cohort of 50 patients supported by axillary IABP placement as bridge to heart transplant (median of 18 days), IABP implantation was successful in all patients, and only 4 patients (8%) had significant thromboembolic or bleeding complications, without long-term sequelae.[4] However, IABP malposition was common and occurred in 22 patients (44%). All patients were able to sit upright and ambulate, and 16 of them underwent physical therapy. Despite prolonged IABP placement in the aforementioned studies, the rate of infection was negligible.[4,5]

Given the large insertion sheath, transfemoral access is associated with increased risk of peripheral vascular complications and limitation of patient mobility. Further, long-term use of a femoral IABP in those requiring extended support is also associated with increased risk of infection. Previous studies reported a 42% increase in the rate of infection related to femoral placement of an IABP in patients who required mechanical support for 20 days or more.[6,7] Malposition of the IABP is one complication that is more common with transaxillary access; however, it only requires simple bedside repositioning.[4,5] Moreover, the axillary artery is more prone to injury during sheath insertion because it has higher elastic properties and thinner walls compared with the femoral artery. Also, the anatomic location precludes effective manual compression at the puncture site and thus higher risk of hemorrhagic shock if bleeding occurs.

In conclusion, ultrasound-guided transaxillary IABP placement is an alternative technique that can be useful in patients with severe occlusive peripheral artery disease and acute limb ischemia and allows ambulation in those requiring prolonged IABP support. Further studies are needed to evaluate the safety and clinical outcomes of this relatively new approach.

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Multiple Cranial Neuropathies From Nivolumab in a Patient With Metastatic Hepatocellular Carcinoma

To the Editor: Nivolumab is a checkpoint inhibitor immunotherapy with multiple clinical indications. Based on encouraging activity from a phase 1/2 single-arm study,[1] nivolumab now has accelerated approval for use as second-line therapy for advanced hepatocellular carcinoma.[2] A phase 3 confirmatory study comparing nivolumab with sorafenib is ongoing.[3] As the use of nivolumab increases, it is important to be aware of potential immune-related adverse effects, including the rare subset of neurotoxicities. To date, nivolumab has been linked to cases of encephalitis, acute and chronic immune demyelinating polyneuropathy, myasthenic syndromes, and myositis.[4] We report a case of nivolumab-induced multiple cranial neuropathies.

Report of Case. Our patient, a 64-year-old man with a history of metastatic hepatocellular carcinoma from hepatitis C, was treated with off-label nivolumab, 3 mg/kg, every 2 weeks.[1] There had been progression of disease despite various therapies, including transarterial chemoembolization, sorafenib, and a blinded study medication as part of a placebo-controlled trial evaluating tivantinib.[5] After receiving 4 doses of nivolumab, the patient gradually developed slurred speech, difficulty swallowing, abnormal extraocular movements, and left-sided facial droop over the course of a few weeks. He had lost 6.75 kg. At this point, he was treated empirically with dexamethasone, 20 mg/d, for a potential drug adverse effect and had a percutaneous endoscopic gastrostomy tube placed for enteral nutrition.

Two weeks later, the patient had worsening of symptoms, with severe bilateral facial droop, bilateral internuclear ophthalmoplegia, left-sided ptosis, severe dysarthria, and an impaired gag reflex, consistent with dysfunction in bilateral cranial nerves III, VII, X, and XII. He was hospitalized and intubated shortly thereafter due to inability to protect his airway. Lumbar puncture specimens yielded negative results on cytologic examination, comprehensive infectious studies, and paraneoplastic antibody tests. Magnetic resonance imaging of the brain with contrast medium revealed faint enhancement of left cranial nerve III consistent with inflammation (Figure).

The patient was diagnosed with nivolumab-induced multiple cranial neuropathies. He was treated with simultaneous intravenous methylprednisolone, 1 g/d for 5 days, and plasma exchange for 7 days. On hospital day 8, he was extubated and had improvement in extraocular movements. Because of persistent left-sided facial droop, dysarthria, and dysphagia, he was also treated with a 5-day course of intravenous immunoglobulin, 2 g/kg daily. Four months after hospitalization, he had nearly complete recovery with his only deficits being a mild left-sided facial droop and left

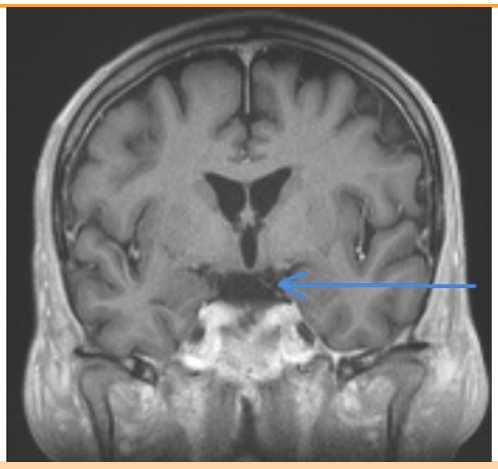

FIGURE. Coronal T1-weighted magnetic resonance imaging of the brain with contrast medium shows enhancement of left cranial nerve III (arrow).