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Testicular pure seminoma in a septuagenarian with a left-ventricular assist device

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ABSTRACT

The left ventricular assist device (LVAD) is an implanted mechanical pump that supports circulatory function for patients with advanced heart failure. LVAD survival has continuously improved over the last decade with an increasing number of patients requiring non-cardiac surgeries. We discuss a 77-year-old, LVAD-dependent male with an enlarging, indurated right testicular mass. Radical inguinal orchiectomy confirmed pure seminoma. The case highlights perioperative considerations in this unique cohort of patients.

Introduction

The left ventricular assist device (LVAD) supports circulation for advanced heart failure. LVAD serves as a bridge to myocardial recovery, transplantation or as lifelong support. Advances have resulted in one-year-survival over 80% with certain individuals surviving over 10 years.[1,2] As a result, there are increasing LVAD candidates requiring non-cardiac surgeries (NCS). Factors impacting NCS include life expectancy and possibility of future transplantation. Further, interventions have higher risk of bleeding and cardiovascular events.

We describe a 77-year-old male with an enlarging, right testicular mass two years after LVAD. Radical orchiectomy was performed in coordination with the LVAD team and final pathology showed a localized seminoma. Management considerations are discussed. This represents the first reported case of resected testicular germ cell tumor in an LVAD patient.

Case presentation

A 77-year-old male presented with an enlarging right testicular mass. He reported a remote history of light testicular trauma years earlier. Past medical history included chronic congestive heart failure, gout, diverticulosis and right inguinal hernia repair. Two years earlier, a HeartMate II LVAD was placed for advanced heart failure as final destination therapy with no expected myocardial recovery and no prospect of heart transplantation. Medications included furosemide, coumadin, carvedilol, digoxin, sildenafil and spironolactone.

On examination, he was ambulatory and conversational. He drove regularly and lived independently. He carried an Indiana Jones-type satchel with the LVAD battery. There was a 3 cm × 3 cm indurated mass in the right testicle. There was no invasion of the spermatic cord or scrotal skin. The left testicle was normal. There was no abnormal adenopathy of the groin, abdomen or neck.

Alpha-fetoprotein (AFP) was 0.9 ng/mL, beta-human chorionic gonadotropin (bHCG) was elevated to 9.9 mIU/mL, lactate dehydrogenase (LDH) was 231 U/L. Scrotal ultrasound showed a 2.2 × 1.8 cm intratesticular mass in the right testicle with internal vascular flow with a contiguous heterogenous mass replacing the epididymis (Fig. 1A). CT scan of the chest, abdomen and pelvis was negative for metastatic disease. Coronal images demonstrate tubing components of the LVAD (Fig. 1B).

The high clinical suspicion of malignancy was presented to the patient and LVAD team. The risks and benefits of monitoring versus radical orchiectomy were discussed and the patient elected to proceed with surgery. Coumadin was held before surgery and he was preadmitted to the LVAD service for monitoring and intravenous heparin.

Surgery was performed in a cardiac surgery room with the support of a cardiac anesthesiologist and perfusionist. An oblique inguinal incision was made and the testicle was dissected free and delivered into the wound. On palpation, tumor was localized to the testicle with no spermatic cord invasion. To decrease the risk of retroperitoneal bleeding, the external fascia was preserved and the spermatic cord was ligated at the

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external ring (Fig. 2). Histologic examination showed a 3.5 cm pure seminoma with epididymal invasion, pT2, with a negative spermatic cord margin (Fig. 3).

The patient was maintained on heparin for coumadin bridging after surgery with no bleeding complications. Post-operatively, the wound healed well and there were no cardiovascular complications. Tumor markers returned to normal at 6 weeks. He was classified as National Comprehensive Cancer Network Stage IB pure seminoma based on the presence of epididymal invasion (pT2). Follow-up management strategies including #1: surveillance imaging, #2: single-agent carboplatin and #3: radiation therapy was discussed, and the patient was placed on surveillance based on prevailing guidelines and his overall condition.

Discussion

This is the first report of an orchiectomy for seminoma in an elderly male with a permanent LVAD. It highlights several important points.

First, cardiovascular condition and functional status are the primary determinants of potential benefit of NCS in LVAD patients. The patient should demonstrate regular LVAD follow-up and future cardiac treatments should be considered. Candidates for transplantation should have more expeditious surgery if malignancy is suspected to remove a potential exclusion. If the LVAD is the final destination, life expectancy and competing morbidities impact the decision. In this case, the patient had his LVAD for two years, was compliant with follow-up and was highly functional.

Second, LVAD patients have higher risks of complications following NCS. Mentias et al. found major adverse cardiovascular events (MACE) in 16.9% of urgent/emergent surgeries and 7.1% of elective cases.[1] Surgery within 6 months of LVAD placement and post-operative kidney injury increased the risk of complications. LVAD patients also have higher rates of bleeding and thrombotic events from the interaction of the device and the coagulation system and common use of anticoagulants.[3] Perioperative management of anticoagulation should be done in collaboration with the LVAD team and surgical techniques to decrease post-operative bleeding should be employed. Here, we preserved the external fascia and performed a lower ligation of the spermatic cord to decrease the chance of retroperitoneal bleeding.

Finally, tumors in elderly men have a distinct histologic distribution and natural history compared to those in younger men. Non-germ cell tumors including lymphoma, Leydig-cell tumors and paratesticular sarcomas are more common. Germ-cell derived spermatocytic tumor are also found almost exclusively in men after the fifth decade. These rarely metastasize and are typically cured with orchiectomy. Malignant germ cell tumors above the sixth decade are rare, but appear to present at a more advanced local stage compared to young men. Berney et al. reviewed 50 cases of malignant GCT in men 60 years and over collected from across the United Kingdom.[4] 41 (82%) were seminoma, median tumor size was 6 cm (range 2–11 cm), vascular invasion was seen in 18 (36%) cases and rete testis invasion was observed in 26 of 37 (70%) of reviewed cases. Based on these findings, orchiectomy has a useful diagnostic and potentially curative role in the elderly male with a suspicious testicular mass.

Fig. 2. Gross surgical specimen with a solid mass arising in the testicle with a contiguous heterogenous mass replacing the epididymis. Short spermatic cord ligated at the external ring.

Conclusion

Patients with LVAD have unique bleeding risks, life expectancy and potential future cardiac therapies that must be considered in planning elective, non-cardiac surgeries. Radical orchiectomy for a suspicious testicular mass in this setting is feasible when performed in close collaboration with the multidisciplinary LVAD team and has diagnostic and therapeutic benefits.

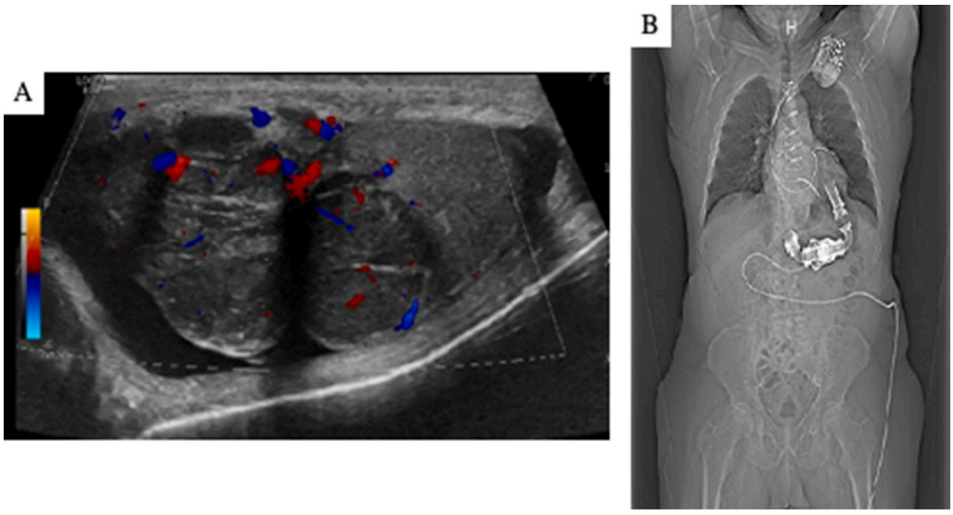

Fig. 1. A) Scrotal ultrasound demonstrates a 2.2 × 1.8 cm intratesticular mass in the right testicle with internal vascular flow. B) Coronal CT scout image demonstrates the HeartMate II LVAD and percutaneous lead exiting the body.

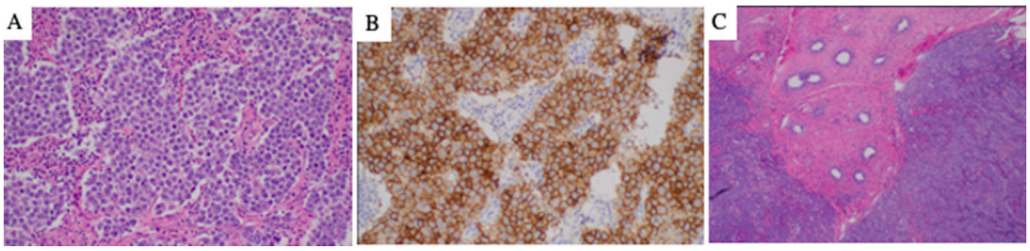

Fig. 3. A) Hematoxylin and eosin (H&E) stain demonstrates large cells with polygonal nuclei with prominent central nucleoli arranged in sheets and small nests consistent with pure seminoma. B) Immunohistochemistry shows cd117 (c-kit) positivity which is commonly seen in seminoma. C) H&E shows direct invasion of tumor cells into the muscular wall of the epididymis.

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