Aortobisiliac graft thrombosis in bacillus Calmette-Guérin disseminated infection with graft involvement

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ABSTRACT

Bacillus Calmette-Guérin (BCG), a live attenuated form of *Mycobacterium bovis,* is part of the therapy for non–muscle-invasive bladder cancer. Cases of vascular graft infection in the context of BCG dissemination are rarely reported in the literature. We report a case of a 77-year-old man, who underwent intravesical instillation of BCG approximately 10 years earlier and presented to our hospital with acute thrombosis of a previous aortobisiliac graft, which tested positive for BCG infection. Aortic graft infections due to BCG dissemination are rare, but possible, complications. A prompt and multidisciplinary approach is necessary. (J Vasc Surg Cases Innov Tech 2024;10:101504.)

Keywords: BCG infection; Aortic graft infection; Aortic graft thrombosis

Bacillus Calmette-Guérin (BCG) is an attenuated form of *Mycobacterium bovis* (tuberculous bacillus) widely used as intravesical immunotherapy in noninvasive cancer management of the bladder.[1] Some rare cases of disseminated tuberculosis infection as consequence of previous treatment with BCG have been described. Aortic involvement in cases of disseminated BCG infections represents a rare pathology that can lead to the development of mycotic aneurysms, which generally involve the abdominal aorta and the descending thoracic aorta or graft infection.[2,3] In brief, 15 cases of vascular graft infection from *M. bovis* can be found in literature, as described in the review of Arsuffi et al.[3] We describe a case of acute thrombosis of a previous aortobisiliac graft in the context of tuberculous graft infection caused by BCG disseminated infection. The patient provided written informed consent for the report of his case details and imaging studies for scientific purposes.

CASE REPORT

A 77-year-old man with no risk factors for tuberculosis infection except intravesical BCG instillation as therapy for bladder cancer approximately 10 years earlier presented because of severe acute bilateral limb ischemia.

His medical history was significant for tamponade rupture of an abdominal aortic aneurysm 9 months earlier, for which the patient presented to the emergency room with abdominal pain and hemodynamically stable. He underwent aortobisiliac grafting with a Dacron prosthesis. He had a regular postoperative course free of major complications, including 24 hours of hospitalization in the intensive care unit for postoperative monitoring, a transfusion of 500 mL of red blood cell concentrate, and 7 total days of hospitalization, with discharge home in good clinical condition. After discharge, the patient also attended an outpatient visit approximately 40 days postoperatively, in which patency of the aortic graft and direct flow in both common femoral arteries were detected on ultrasound.

Computed tomography angiography (CTA) was immediately performed, and thrombosis of the previous aortic graft was diagnosed. Two relevant details also described in the CTA were the presence of a voluminous retroperitoneal abscess in the place of a retroperitoneal hematoma from the previous surgery (Fig 1) and the presence of a mass of undefined nature on the right side of the groin (no groin surgery reported in his history), causing skin fistulization and infiltration of the vascular structures of the groin itself (Fig 2). The blood test results at admission showed only slight leukocytosis and a minimal increase in C-reactive protein (white blood cell count, 10.81 k/mm^3; C-reactive protein, 23.3 mg/L).

The patient was taken to the operating room, and, after an unsuccessful attempt at bilateral thromboembolectomy, right axillobifemoral bypass was performed to restore the limbs' flow. Ultrasound-guided drainage of the retroperitoneal abscess and surgical excision of the groin mass were also performed. In both cases, microbiological analysis revealed a polymerase chain reaction-positive result for Mycobacterium tuberculosis complex infection. The absence of certain infectious involvement of the aortic prosthesis, clinical fragility of the patient, and the initial suspicion that the inguinal mass could represent a neoplastic mass led us to opt for the quickest solution to resolve the limb ischemia, initially excluding explantation of the aortic prosthesis. With consultation with the infectious disease specialist, who diagnosed disseminated BCG infection, medical therapy with rifampicin, isoniazid, and ethambutol was also started.

In consideration of the subsequent dehiscence of both groin accesses with pus leakage on the right and the strong suspicion

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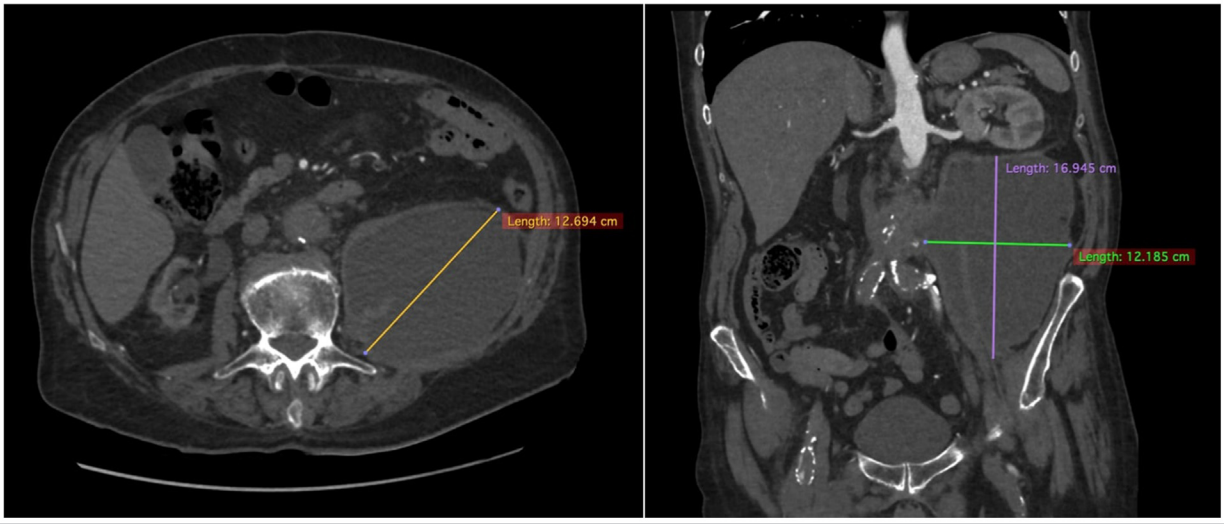

Fig 1. Computed tomography angiography (CTA) showing voluminous retroperitoneal abscess.

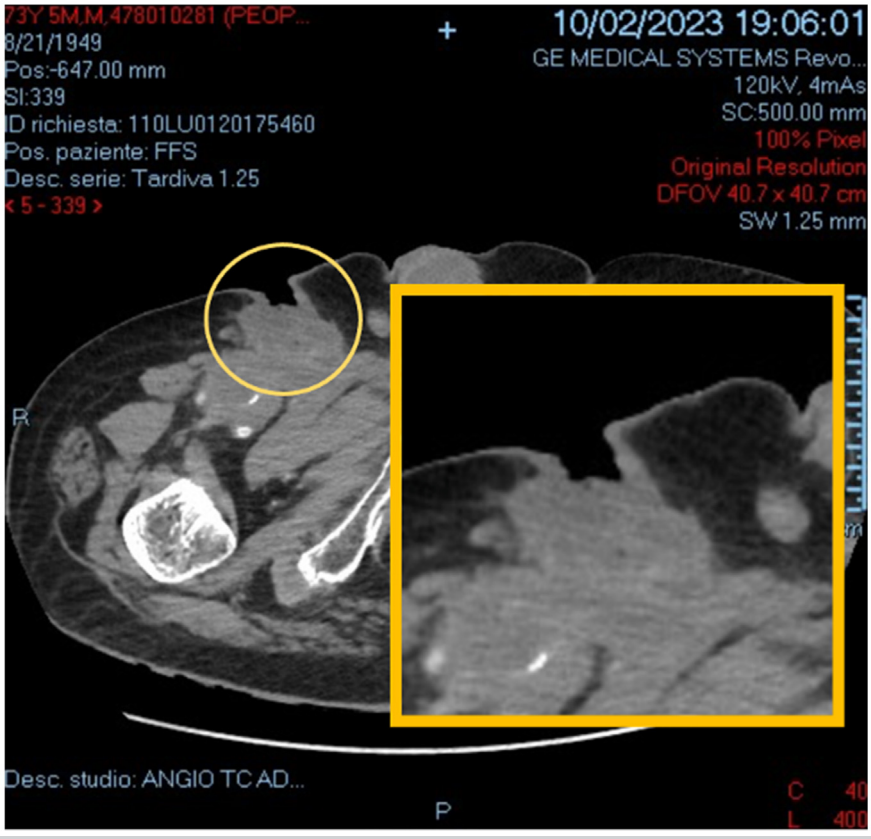

Fig 2. Computed tomography angiography (CTA) showing right groin mass causing fistulization toward the surface.

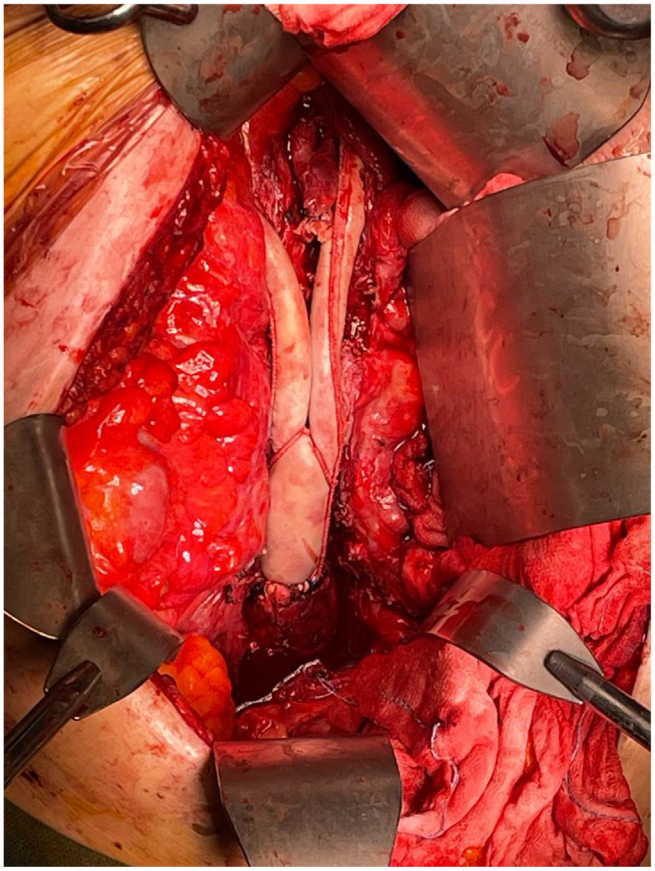

Fig 3. Intraoperative photograph showing in situ reconstruction with aortobifemoral graft of bovine pericardium.

of infectious involvement of both prostheses (axillobifemoral bypass and previous aortic graft), explantation of both existing prostheses and placement of a new biological aortobifemoral graft of bovine pericardium were performed (Fig 3). Both explanted prostheses were subsequently found to be involved in the BCG infectious process on microbiological analysis. In the right side of the groin, from which the mass was removed, a negative pressure dressing was initially placed for 15 days, with empiric antibiotic therapy with piperacillin-tazobactam. Subsequently, in collaboration with a plastic surgeon, the groin was reconstructed by performing a skin rotation flap.

The patient, after 2 months of hospitalization, was discharged to a medical rehabilitation facility. Before discharge, follow-up CTA was performed, with demonstration of patency of the new graft and disappearance of the infected retroperitoneal mass (Fig 4). Duplex ultrasound and outpatient vascular visit were also performed 1 month after discharge, without evidence of problems. CTA is scheduled to be repeated at 6 to 10 months. The patient has also continued infectious outpatient follow-up.

DISCUSSION

BCG is an attenuated form of *M. bovis* (bacillus of tuberculosis), rendered inactive as an infectious agent, but that involves an immunostimulant reaction. It was initially used as an antituberculosis vaccine and is now widely used as intravesical immunotherapy in the management of noninvasive bladder cancer. Its antigenic properties activate an immune response at the bladder level that has proved effective in the treatment of superficial

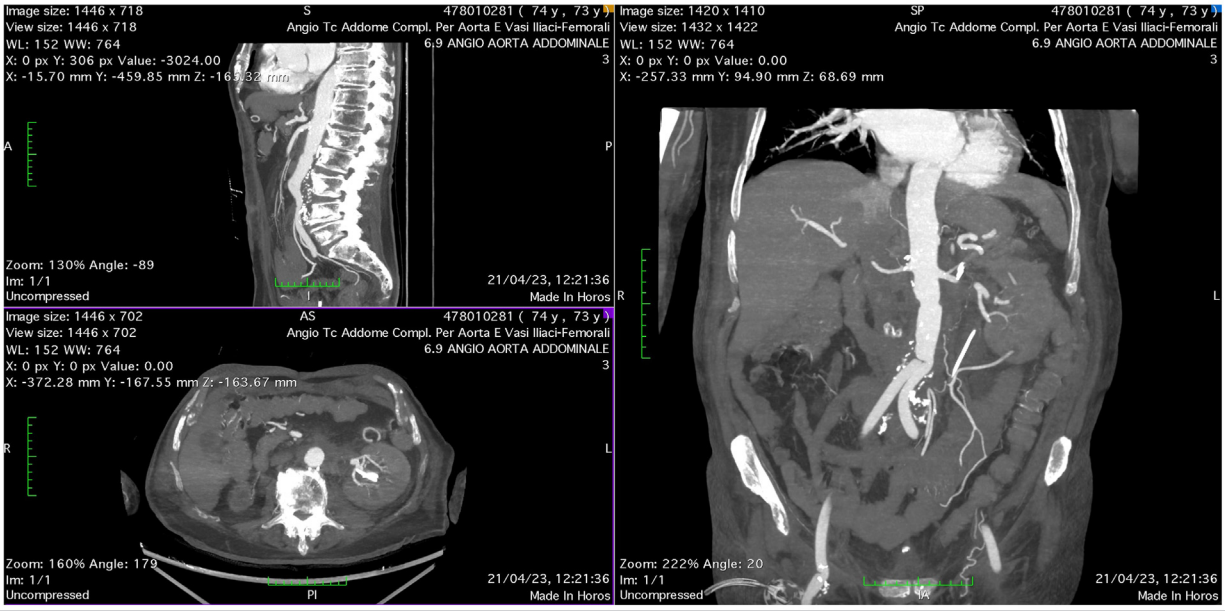

Fig 4. Follow-up computed tomography angiography (CTA) 2 months after explantation and in situ reconstruction.

bladder neoplasms to reduce both the risk of recurrence and progression toward more invasive bladder disease.[1,4]

A rare side effect of BCG treatment is disseminated BCG infection that can occur even years after treatment. It can lead to latent BCG infection that can persist for several years. These latent infections can flare years after the initial infection and manifest as granulomatous pneumonia, abscesses, infected aneurysms, and infections of implants, grafts, or the surrounding tissue. These can remain undetected and persist long after therapy has ended.[5] Because there are no further obvious causes, our suspicion is that, in our patient, the aneurysmal rupture might have been the event triggering the reactivation of the latent infection and subsequently finding the ideal nidus for its development in the retroperitoneal hematoma. It is possible that involvement of the aortic graft then evolved because of the contiguous retroperitoneal infection, although the twofold different locations of the primary infection still suggest a state of disease dissemination, although the pathogenetic mechanisms of systemic BCG infection are not yet completely clear.[6]

Involvement of the aorta (or of an aortic graft, as in our patient) is rare but usually very severe. Fundamental in these cases is a multidisciplinary surgical vascular and infectious disease approach. The medical therapy generally will not differ from the standard tuberculous regimen and must be continued, as per protocol, for ≥6 months.

As known, graft infections represent among the most dangerous and serious complications of aortic surgery, leading to very high mortality rates. In this sense, the promptness of intervention and prompt recognition of the cause of infection appear to be fundamental to be able to start adequate therapy as soon as possible. Of demonstrated efficacy in in situ reconstruction for cases of aortic graft infection are biological prostheses of bovine pericardium, which have demonstrated excellent resistance to infectious processes and excellent durability over time.[7]

CONCLUSIONS

Disseminated BCG infections involving aortic grafts as a complication of previous BCG therapy are possible, even several years after treatment, and are usually devastating. A careful history taking is essential, and a multidisciplinary infectious disease and vascular surgical approach with in situ reconstruction using biological prostheses appears to be the recommended strategy.

DISCLOSURES

None.

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