Urology Case Reports 36 (2021) 101574

Contents lists available at ScienceDirect

Urology Case Reports

journal homepage: http://www.elsevier.com/locate/eucr

Inflammation and infection

A case of infectious thoracic aortic aneurysm after intravesical Bacillus Calmette-Guérin instillation therapy for a superficial bladder cancer

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ARTICLE INFO

Keywords:
Bacillus calmette-guerin
Infectious thoracic aortic aneurysm
Intravesical instillation
Mycobacterium bovis

ABSTRACT

Intravesical Bacillus Calmette-Guérin instillation therapy after transurethral resection of bladder tumor is considered as the most effective treatment for prophylaxis against the recurrence of high-risk, non-muscle bladder cancer. However, intravesical Bacillus Calmette-Guérin instillation therapy has some characteristic complications. Here, we report a case of infectious thoracic aortic aneurysm related to prior intravesical Bacillus Calmette-Guérin instillation, which consequently allows the spread into the adjacent lung tissue and secretion in sputum of Mycobacterium bovis.

Introduction

Intravesical Bacillus Calmette-Guérin (BCG) instillation therapy after transurethral resection of bladder tumor (TURBT) is considered as the most effective treatment for prophylaxis against the recurrence of high-risk, non-muscle bladder cancer. However, BCG is a live attenuated strain of Mycobacterium bovis (M bovis), therefore, the therapy has some characteristic complications and one of the complications is tuberculous infectious aneurysm that affects major arteries. Here, we report a case of infectious thoracic aortic aneurysm related to prior intravesical BCG instillation, which consequently allow the spread into the adjacent lung tissue and secretion in sputum of M bovis.

Case presentation

An 80-year-old man presented to our hospital because of gross hematuria. Cystoscopy and TURBT revealed carcinoma in situ of the bladder. Three weeks later from the TURBT, he was given 80 mg BCG intravesical instillations every week for eight weeks.

Two weeks later from the last treatment, he had suffered from long-lasting fever and poor appetite, and lost 10 kg in three months from the last BCG intravesical instillation. His laboratory findings were as follows: CRP 4.31mg/dL, AST 66U/L, ALT 70U/L. The urinary sediment analysis and computed tomography (CT) revealed no evidence of infection. In addition, no evidence of recurrence or progression of bladder cancer was apparent during urine cytodiagnosis and cystoscopy analysis. Furthermore, the gastrointestinal endoscopy and echocardiographic inspection did not show any specific finding. In addition to the lack of definitive evidence of BCG dissemination, because of spontaneous improvement of the symptoms, observation without treatment was adopted at that time.

Ten months later from the intravesical instillations, he developed bloody sputum. CT revealed an infiltrative consolidation to his upper lung (Fig. 1), and M.bovis was detected from his sputum by polymerase chain reaction. Under the diagnosis of pulmonary infection of M.bovis, medical therapy for tuberculosis (isoniazide, rifampcin, and ethambutol)was started. His bloody sputum regressed soon after the introduction of this therapy.

After ten months of medical therapy for tuberculosis, there was no improvement in chest X-ray examination. CT revealed an infectious thoracic aortic aneurysm with air in the vascular wall (Fig. 2), and he was diagnosised with tuberculous infectious thoracic aortic aneurysm. He was treated with thoracic endovascular aortic repair (TEVAR), and antibiotic therapy was continued. There was no recurrence at 24 months after treatment with TEVER.

Abbreviations: BCG, Bacillus Calmette-Guérin; TURBT, transurethral resection of bladder tumor; CT, computed tomography; TEVAR, thoracic endovascular aortic repair; M.bovis, Mycobacterium bovis.

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https://doi.org/10.1016/j.eucr.2021.101574
Received 21 December 2020; Received in revised form 12 January 2021; Accepted 14 January 2021
Available online 20 January 2021

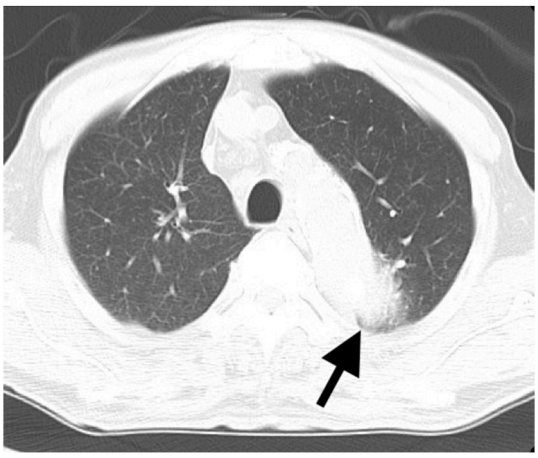

Fig. 1. An infiltrative consolidation to his upper lung.

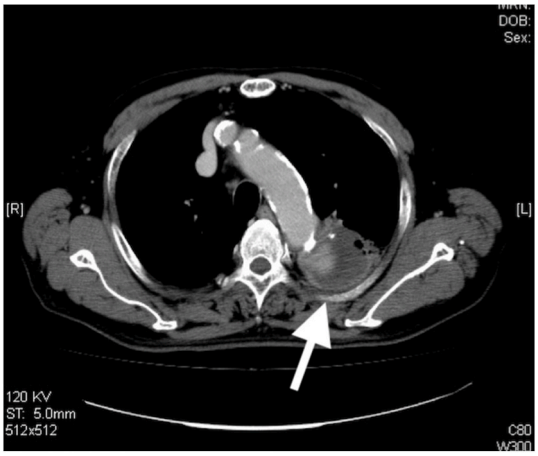

Fig. 2. An infectious thoracic aortic aneurysm with air in the vascular wall.

Discussion

BCG immunotherapy after TUR is the gold standard treatment for non-muscle-invasive bladder cancer (stage pTa, pT1, pTis).[1] Although its mechanism of action against bladder carcinoma is not fully understood, use of BCG induces a multifaceted inflammatory response that has antitumor effects. Owing to the presence of viable mycobacteria, several adverse reactions such as fever, hematuria, and lower urinary tract symptoms have been reported.[2] On the other hand, rare cases of serious complications, such as interstitial pneumonitis, military tuberculosis, hepatitis, sepsis, and infectious aortic aneurysm have been reported.[3] Among these ectopic dissemination of BCG, infectious aneurysm is a relatively rare entity. To date, only 30 cases of tuberculous infectious aortic aneurysm after intravesical BCG therapy have been reported in the English-language literature. The infectious aortic aneurysm often has a long time of onset from BCG therapy, and the mean time is approximately 25 months.[4] This long latency of Mycobacterium in the aortic wall might make the diagnosis difficult. Lamm et al. recommend that if the fever greater than 38.5 prolongs for more than 24 hours after BCG instillations, initial treatment should be aggressive and utilize isoniazid.[3]

It was reported that the mean growth rate of the aortic aneurysm was 0.12 cm/year.[5] Therefore, several factors such as infection of the aortic wall should be considered in this case of the rapid growth of the aneurysm. Considering the negative blood culture results, the infiltrative consolidation to the lung adjacent to the aneurysm and the detection of M.bovis from the sputum, this case may be an infectious aortic aneurysm caused by the disseminated BCG infection.

In our case, bacteria were disseminated hematogenously and colonized his blood vessel wall during continuous mild fever and anorexia after BCG therapy. Retrospectively, the lack of therapeutic intervention at this latent period might facilitate successive aneurysmal formation and invasion of pathogen to the adjacent lung tissue. Therefore, in addition to the prevention of dissemination, urologists should be aware of the possibility of long-lasting latency of ectopic infection of M.bovis such as the case of aortic wall, for the appropriate therapeutic intervention.

Conclusion

Infectious aneurysm caused by M.bovis is one of the complications, which has difficult diagnosis because of its long latency. Moreover, our case suggests that delay of therapeutic intervention could cause the contagious lung infection consequently. Every urologist should be aware of how to manage this rare complication, to prevent epidemiologic consequence.

Funding sources

This research did not receive any specific grant from finding agencies in the public, commercial, or not-for-profit sectors.

Declaration of competing interest

The authors have no conflicts of interest to declare.

Acknowledgement

The authors thank the patient, who participated in this case report, for his important contributions.

References

1. Brausi M, Witjes JA, Lamm D, et al. A review of current guidelines and best practice recommendations for the management of nonmuscle invasive bladder cancer by the International Bladder Cancer Group. *J Urol.* 2011;186:2158–2167.
2. Brausi M, Oddens J, Sylvester R, et al. Side effects of Bacillus Calmette-Guérin (BCG) in the treatment of intermediate- and high-risk Ta, T1 papillary carcinoma of the bladder: results of the EORTC genito-urinary cancers group randomised phase 3 study comparing one-third dose with full dose and 1 year with 3 years of maintenance BCG. *Eur Urol.* 2014;65:69–76.
3. Lamm DL, Meijden PM, Morales A, et al. Incidence and treatment of complications of bacillus Calmette-Guerin intravesical therapy in superficial bladder cancer. *J Urol.* 1992;147:596–600.
4. Orii K, Honda J, Hirai Y. Tuberculous abdominal aortic aneurysm after intravesical Bacillus Calmette-Guérin therapy. *Jpn J Vasc Surg.* 2012;21:803–808.
5. Coady MA, Rizzo JA, Hammond GL, et al. What is the appropriate size criterion for resection of thoracic aortic aneurysms? *J Thorac Cardiovasc Surg.* 1997;113:476–491.