Use of synthetic bone substitutes loaded with antibiotics in the management of three chronic infections on instrumented spine

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Introduction

Chronic infections on instrumented spine (CIIS) are complex and often require extensive management.
When resection surgery is performed, it results in a dead space. The use of a bone substitute composed of hydroxyapatite and calcium sulfate loaded with gentamicin is routinely performed in our reference centre for the management of chronic cavitary osteomyelitis.
We report here 3 cases to illustrate the combined use of gentamicin- and vancomycin-loaded bone substitutes (UcSO@G+V) in patients presenting with CIIS.
We collected data from three patients with CIIS who received UcSO@G+V within the prospective cohort of our reference center: CRIOAc Lyon.

Case 1

This is a 65-year-old man with a chronic infection of an L3-to-pelvis spinal fusion, documented with methicillin-resistant *Staphylococcus epidermidis (*MRSE) and *Cutibacterium acnes*. Following partial hardware removal and extension of the fusion, persistent bone loss at L2–L3 and L3–L4 required interbody fusion using two cages at these levels combined with UcSO@G+V (*Figure 1)*.

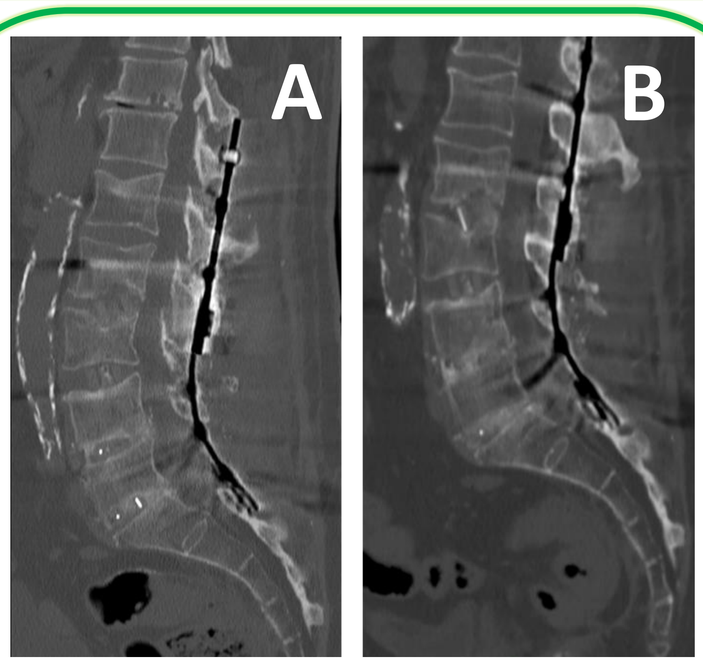

FIGURE 1
(A) Sagittal section, CT scan 6 months after second-surgical stage. **(B)** Sagittal section, CT scan 2 years after second-surgical stage.

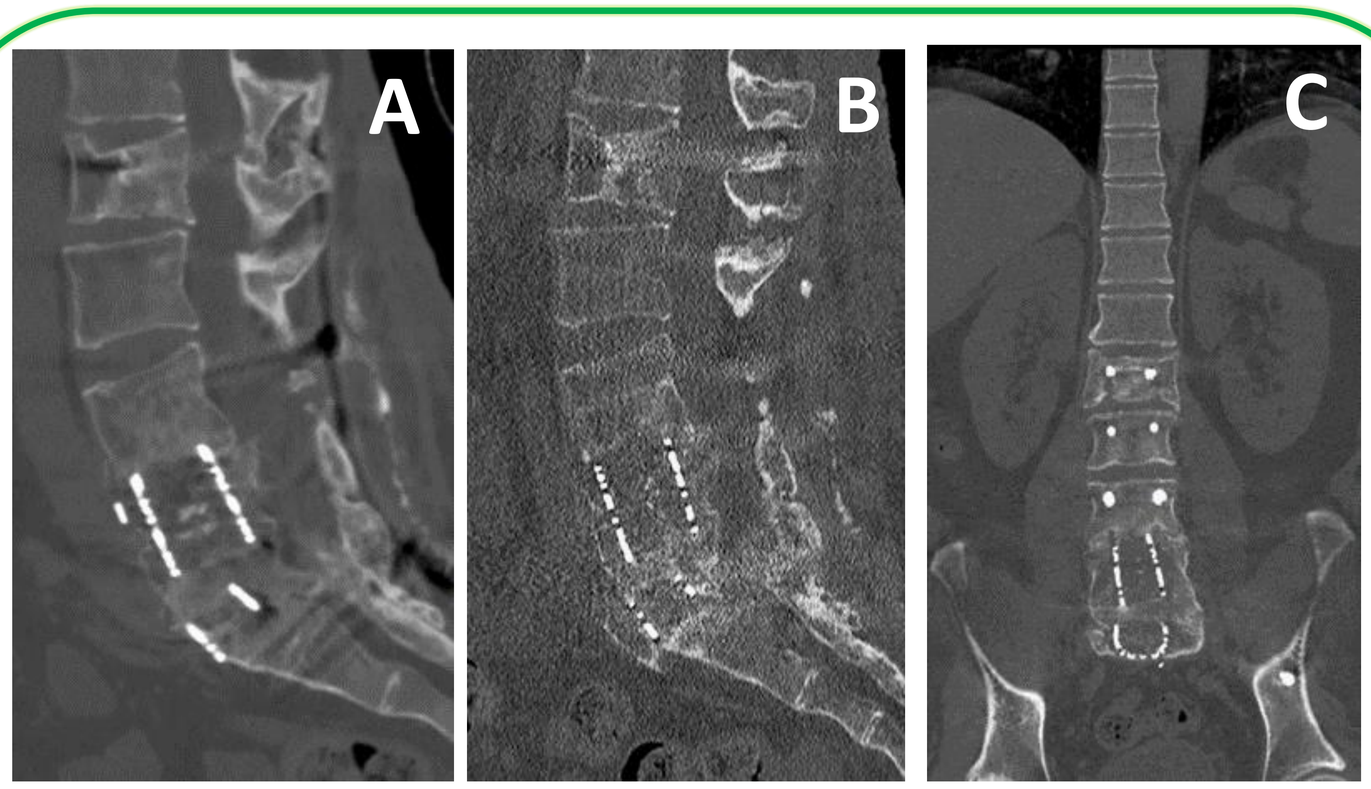

FIGURE 2
(A) Sagittal section, CT scan before second-surgical stage.
(B) Sagittal and **(C)** frontal section, CT scan 2 years after second-surgical stage.

Case 2

This is a 35-year-old man with septic pseudarthrosis following L5–S1 fusion, documented with MRSE. After hardware revision surgery, persistent L5 osteolysis required L5 corpectomy and placement of an L5–S1 cage with UcSO@G+V (*Figure2*).

Case 3

This is a 79-year-old woman managed for acute hematogenous infection of a T2-to-iliac fusion, documented with *Escherichia coli*, complicated by T7–T8 spondylodiscitis. After hardware revision, a second-stage T7–T8 debridement with fixation and UcSO@G+V implantation was performed (*Figure 3*).

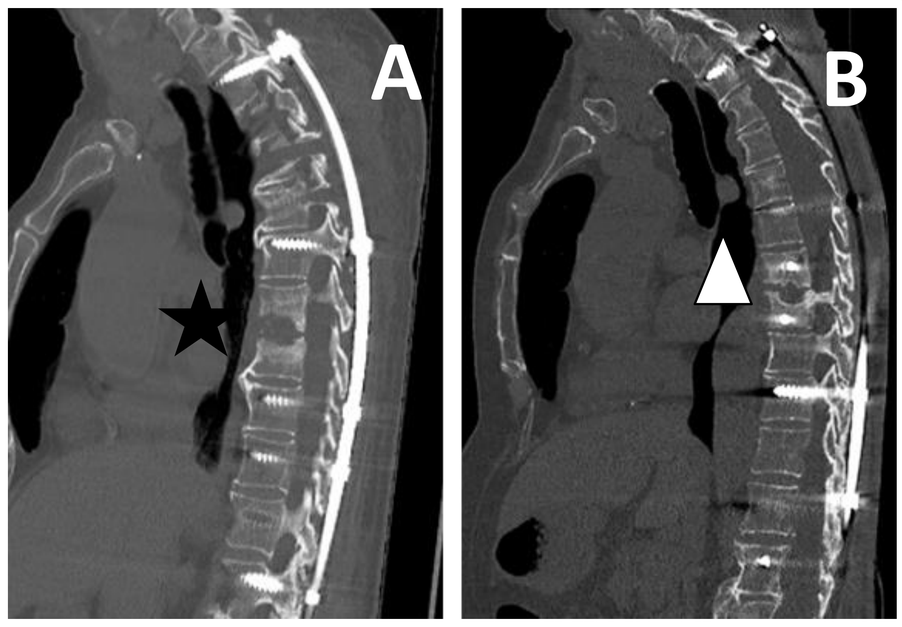

FIGURE 3
(A) Sagittal section, CT scan before the second-surgical stage, T7-T8 ostéolysis. ★
(B) Sagittal section, CT scan one year after the second-surgical stage, T7-T8 arthrodesis. △

In all three cases, management was validated in a multidisciplinary team meeting, combined with targeted antibiotic therapy for 3 to 6 months. Outcomes were favorable, with infection resolution and bone consolidation at 1- to 2-year follow-up.

Conclusion

In cases of bone loss, UcSO@G+V allows dead space filling, enables local delivery of vancomycin and gentamicin over several weeks, and promotes bone healing due to its hydroxyapatite and calcium sulfate composition. Infection resolution and bone consolidation were achieved in all three patients with CIIS treated with UcSO@G+V. This highlights the crucial role of infectious disease specialists in managing local antibiotic therapy in CBJI.

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