INTRODUCTION
Fungal and tuberculous spine infection are usually categorised under the same group as non-typhoidal infections. Fungal spondylitis is rare; it only accounts between 0.7-2.7% of all spine infections. Therefore, simultaneous infection by both fungal and tuberculous organisms is even more remote. Immunocompromised patients are easily susceptible to non-typhoidal spine infections as these pathogens are mainly opportunistic.

As we have yet to come upon such precedence in the literature, we report an interesting case of both fungal and tuberculous spine infection occurring simultaneously in a patient who is not immunocompromised.

CASE REPORT
A 66 years old previously healthy gentleman presented to us with severe backpain for a 2-week duration, associated with bilateral lower limb weakness. He had preceding history of chronic back discomfort, for which he did not seek any medical attention. The backpain was aggravated whenever he tried to change his posture. There were infrequent episodes of night sweats, but he denied presence of chronic cough. There was no history of trauma. He gave a past medical history of undergoing laparoscopic cholecystectomy in 2015 for acute cholecystitis caused by gallstones, for which he recovered uneventfully. There was no history of malignancy, intravenous drug or alcohol abuse, or sexual promiscuity. Tuberculosis contact tracing was negative.

Further examination revealed a lean, alert patient in agonal pain. There was kyphotic deformity, with localised tenderness at thoracolumbar spine. Neurological examination of lower limbs exhibited at least grade 3 power for all muscle groups innervated by L2 to S1. The anal tone and perianal sensation were intact. Examination of other systems was unremarkable, and there was no cutaneous or mucosal manifestation of chronic infection.

Laboratory investigations returned with a normal white cell count (9.5x10^3/L; blood) but elevated erythrocyte sedimentation rate (113mm/hr). The full blood count, routine profile and liver function test were normal. Screening for HIV and hepatitis were negative. The poorly-penetrated thoracolumbar radiograph showed collapse of T10 and T11 vertebrae, with endplate erosion. Urgent magnetic resonance imaging (MRI) of the spine confirmed the findings, as shown below.

Figure 1. T2-weighted sagittal images of the magnetic resonance imaging (MRI) showed collapse of T10 and T11 vertebrae, with hyperintense signal suggestive of collection confined to subadjacent region of anterior column and within the intervertebral disc space. The disc height appeared to be maintained, suggestive of minimal disc involvement. The spinal cord was compressed due to the vertebral destruction, and the spinal alignment was kyphotic due to the collapse.

Subsequently, an image-guided spinal biopsy was performed. Despite increased analgesic dosage, the patient was woken. Eventually he underwent debridement, posterior decompression and stabilisation of the spine from T7 to L3 level. Intraoperatively, there were minimal semi-purulent collection evacuated, with the T10 and T11 vertebrae were soft and fragile.

The Twin Terror: Fungal and Tuberculous Co-infection of the Spine In a Non-Immunocompromised Patient
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After the culture results returned, oral fluconazole was added. However, after 4 weeks, his liver function deteriorated, it was attributed to the oral antifungal (rather than the anti-TB drugs), thus it was stopped. The ESR normalised and the CRP levels reduced. Similar steps for the anti-TB regime were completed the anti-TB regime and recovered with no more instability pain and regained almost full muscle power.

Figure 2. Post-operative radiograph (AP and lateral view) showed successful decompression, posterior fusion and instrumentation. The contour demonstrates excision of the thoracolumbar spine. The main indication of the surgery was to alleviate the instability pain, and to decompress the spinal cord at the site of vertebral destruction. Laminectomy was done to decompress the impingement, while the long segment fixation with distraction allows the vertebrae managed to correct and maintain the spinal alignment.

The patient gradually recovered, with better pain control after surgery. The biopsy culture yielded growth of Candida albicans. Surprisingly, Mycobacterium tuberculosis was also isolated from the bone and tissue culture. Polymerase chain reaction (PCR) test for tuberculosis returned a positive result. Histopathological examination confirmed presence of chronic granulomatous inflammation, without caseous necrosis.

The patient was started empirically with intensive phase of anti-tuberculous medications, consisting of rifampicin, isoniazid, pyrazinamide and pyridoxine.

DISCUSSION
Non-typhoidal spine infection is relatively less common but has become increasingly important due to increasing incidence of tuberculosis and immunocompromised patients each year. As fungal spondylitis itself is a rare occurrence, little literature has ever reported spinal infection by both fungal and tuberculous organisms occurring simultaneously. There were only about 100 cases of spine infection case reported by Aspergillus and Candida species respectively with to sporadic articles reporting infection by other type of fungi. Spinal tuberculosis though only accounts for 1% from all tuberculosis patients. Majority of patients who have fungal spondylitis are immunocompromised, or at least having one of the risk factors – malignancy, drug abuse, haemodialysis, burn wounds, central catheter insertion, long-term antibiotics usage and surgery. Our patient had none of this, except that he underwent a laparoscopic cholecystectomy, a minimally-invasive surgery which is unlikely to be the source of the fungal infection.

The insidious onset with gradual progression of non-typhoidal infection manifested in chronic back discomfort, until significant spine segment damage leads to intolerable instability pain. Another common presentation is neurological deficit, commonly as a late presentation. One-third of fungal spondylitis cases have documented fever, but rarely in spinal tuberculosis. Both fungal and tuberculous spondylitis have similar mode of hemmorhagic spread. In Candida spondylitis, half of the patients demonstrated positive blood culture of candidiasis.

Image-guided biopsy and MRI are gold standards. Thoracic involvement, spondylitis spread and affinity towards anterior column causes it to collapse, leading to kyphotic deformity - all of these are evident in the MRI changes in this patient. In fungal spondylitis, two distinct changes in MRI include hyperintensities and presence of intranuclear cleft. Biopsy is not only important to identify the offending organism and for histopathological confirmation, but also determine the effectiveness of medical therapy given.

The real reason of why the simultaneous infection occurred in this case is not known to us. Contaminated sample is one possibility which we investigated – however there was no break in the chain of sterility when handling the samples, while screening through all personnel involved found none of them harbouring any chronic infection. Laboratory cross-contamination may occur, but it is very rare and easily forewarned as it will involve more than one case. Consistent results from samples obtained during both biopsy and surgery suggests that contamination is unlikely.

Medical therapy remains the mainstay treatment in non-typhoidal spine infection. Empirical treatment should be started early whenever tuberculosis is highly suspected: culture or histopathological confirmation may take up to 4-8 weeks. The choice and duration of antifungal treatment for fungal spondylitis are still debated. Decision for single oral azole therapy was made for our patient after considering the factors of convenience and cost. Antifungal therapy however is frequently associated with significant toxicity. The decision was made for our patient to undergo surgery to relieve his severe pain and to prevent the presence of neurological deficit. Other indications for surgery include large abscesses and severe deformity. Surgery provides added advantage of avoiding prolonged bed rest and bracing, while preventing development of late kyphosis.

In conclusion, despite its rarity, fungal and tuberculous co-infection of the spine are becoming more frequent by the day. Treatment by medical means is not possible without combining with surgery whenever it is indicated. Possibility of non-typhoidal spine infection should not be absolved in patients who has no risk factor, especially if they present with clinical and radiological signs being its manifestations. Culture and histopathological examination from biopsy or intraoperative samples are indispensable to ensure optimum outcomes when managing these cases.

REFERENCES