Author’s response to reviews

**Title:** Endplate and intervertebral disc injuries in acute and single level osteoporotic vertebral fractures: Is there any association with the process of bone healing?

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Response to reviewer’s comments

Editor Comments:

Dear authors

This is a great subject of discussion as to when to treat these and what the process of healing these fractures.

This paper needs some minor revisions as indicated by the reviewers.

Also as I was going through the paper I realized that there is a need to mention tougher causes of vertebral fractures especially infections. I will recommend using the following references to add some data on how to differentiate between them, in a few lines. You may want to use the following paper:


The authors really appreciate your important comment and understanding on this paper. I have added the following description (underlined) for differentiating the other pathological fractures such as infection and vertebral tumor in the Method section.

Page 6, line 97:

OVFs were differentiated from vertebral fractures caused by other pathological conditions such as spondylodiscitis and malignant tumors by their characteristic MRI findings [18, 19], blood test and physical findings.

Reviewer reports:

Ahmed Abdelbaki (Reviewer 1): very well written article, the methods and conclusions are very clear.

The authors really thank you for your valuable comments.

Shivang Desai, MD (Reviewer 2): Extremely thorough and well done study.

The same things have been repeated twice and sometimes even more, once in the results or method section and again in the discussion. I suggest removing these repetitions to make this manuscript more to the point.

The authors really appreciate your understanding and important comments on this article. According to reviewer’s comments, the following original description was removed.

Page 14, line 239 (original):

High signal intensity changes of MRIs in the superior and/or inferior IVDs adjacent to OVFs were observed in 101 of 168 vertebrae (60%). Among these, signal changes in both the superior and inferior IVDs adjacent to OVFs were the most common (27% of total OVFs), followed by superior only (23%) and inferior only (10%).
To clarify the prognostic factors for delayed union at six months after OVF, a multivariate logistic regression analysis was performed.

Our study showed that the majority of OVF-induced IVD lesions were grade 1 (81%) followed by grade 2 (1%) with only three discs with grade 3. We defined grade 1 discs as having a diffuse pattern of hyper-intensity in T2 STIR. As shown in Fig. 3, there was a slight high intensity in T2 weighted images and iso to low intensity in T1 WI, indicating that grade 1 discs show tissue edema. A focal pattern of hyper-intensity in T2 STIR was defined as grade 2 in this study.

Importantly, a significant association between endplate injuries and IVD lesions was identified in our study. Moreover, we found that endplate injury had no significant effect on the grading (signal pattern) of adjacent IVD injuries following OVFs.

In the current study, the risk factors for radiographic delayed union at six months post injury were T2 focal high signal alternation within the vertebra and posterior wall injury, however, endplate injury and IVD lesions were not included as independent risk factors.

Because the results of our logistic regression analysis showed that T2 focal high signal of the fractured vertebra and PW injury were identified as independent risk factors that predict delayed union, as also previously reported[10, 34], we examined whether these two identified risk factors have a significant association with endplate or IVD injury.

We have performed a logistic regression analysis to identify the risk factors that predict delayed union based on previously identified candidate factors, including vertebral signal alternation
patterns in MR T1- and T2-WI that were previously reported in a large multicenter cohort study[9, 10].

The authors describe "The prognostic factor patterns of intensity changes within fractured VBs on 164 MR images were classified on both mid-sagittal T1- and T2-weighted image" It is hard to identify marrow changes on T2 images? unless by T2 the authors mean STIR which then needs to be corrected.

Thank you for your important comment. In this study, OVFs were diagnosed by T1-WI and T2-STIR MR images. However, the previous studies that evaluated the candidate factors for delayed union [9, 10], mid-sagittal T1- and T2-WI were used for classification. Therefore, according to the previous study, we used T2-WI but not T2-STIR only for evaluating the candidate factor analysis.

Check for spelling and grammatical errors.

This was corrected accordingly.