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Statistical issues regarding the publication ‘Diagnostic Performance of Advanced Metal Artifact, Reduction MRI for Periprosthetic Shoulder Infection’

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Dear Editor,

I’ve read the paper ‘Diagnostic Performance of Advanced Metal Artifact Reduction MRI for Periprosthetic Shoulder Infection’ (1) with great interest, but it seems there are some statistical issues worth addressing:

1. In Table VII, the frequencies for ‘any joint effusion’ and ‘complex joint effusion’ are identical for both groups, but sensitivity, specificity, positive predictive value, negative predictive value, AUC, and OR differ. Also, it is not described in the methods section how exactly the values and confidence intervals were estimated.
2. In table VII, the percentages in parenthesis in the infected group and the estimated sensitivity should approximately be the same, but for periprosthetic edema of the glenoid values are 45% and 0.54. Further, it is mentioned in table IV that only 21 (out of 22) patients in the infected group and 61 (out of 67) patients in the noninfected group were evaluated for glenoid loosening, because this is only possible for anatomic or reverse total shoulder arthroplasty implants, and not for hemiarthroplasties. Yet, in table VIII, percentage calculations (and maybe also other estimates) for periprosthetic bone resorption of the glenoid and periprosthetic edema of the glenoid are based on total patient numbers instead of only considering patients with a glenoid component.
4. In the results section the authors claim that ‘Standard logistic regression analysis used the advanced MARS-MRI findings of lymphadenopathy, complex joint effusion, and edematous synovitis for deriving the best prediction of PSI (Table VIII). Overall, the model had a sensitivity of 95%, a specificity of 100%, a positive predictive value of 100%, and a negative predictive value of 98%.’ The model misclassifies two cases as infected ([yes, no, no], estimated chance 0.17), and two cases as noninfected ([no, yes, yes] with a chance of 0.96, and [no, no, yes] with a chance of 0.72). This seems contradictory to the reported percentages, such as a specificity of 100%.
5. The authors further state in the results section ‘When lymphadenopathy and complex joint effusion were present, the chance of PSI was 99%.’, but the presence of lymphadenopathy and complex joint effusion in the absence of edematous synovitis is described with an estimated chance of infection of 0.69 in Table VIII.

I hope that these inconsistencies can be clarified swiftly. For me as a medical student, it would be a disappointment if a top journal in its field provided such erroneous information.

Disclaimer: e-Letters represent the opinions of the individual authors and are not copy-edited or verified by JBJS.

References

- (1) Fritz, Jan MD1; Meshram, Prashant MBBS, MS, DNB2; Stern, Steven E. PhD3; Fritz, Benjamin MD4,5; Srikumaran, Uma MD, MBA, MPH6; McFarland, Edward G. MD6,a. Diagnostic Performance of Advanced Metal Artifact Reduction MRI for Periprosthetic Shoulder Infection. The Journal of Bone and Joint Surgery: August 3, 2022 – Volume 104 – Issue 15 – p 1352-1361 doi: 10.2106/JBJS.21.00912

Conflict of Interest: None Declared