

- [9] Gehrke T, Lausmann C, Citak M, Bonanzinga T, Frommelt L, Zahar A. The accuracy of the alpha defensin lateral flow device for diagnosis of periprosthetic joint infection: comparison with a gold standard. *J Bone Joint Surg Am.* 2018;100:42–48. doi:10.2106/JBJS.16.01522.
- [10] Xie K, Qu X, Yan M. Procalcitonin and α -defensin for diagnosis of periprosthetic joint infections. *J Arthroplasty.* 2017;32:1387–1394. doi:10.1016/j.arth.2016.10.001.
- [11] Bauer TW, Parvizi J, Kobayashi N, Krebs V. Diagnosis of periprosthetic infection. *J Bone Joint Surg Am.* 2006;88:869–882. doi:10.2106/JBJS.E.01149.
- [12] Lee YS, Koo K-H, Kim HJ, Tian S, Kim T-Y, Maltenfort MG, et al. Synovial fluid biomarkers for the diagnosis of periprosthetic joint infection: a systematic review and meta-analysis. *J Bone Joint Surg Am.* 2017;99:2077–2084. doi:10.2106/JBJS.17.00123.
- [13] Suen K, Keeka M, Ailabouni R, Tran P. Synovasure “quick test” is not as accurate as the laboratory-based α -defensin immunoassay: a systematic review and meta-analysis. *Bone Joint J.* 2018;100-B:66–72. doi:10.1302/0301-620X.100B1.BJJ-2017-0630.R1.
- [14] Deirmengian C, Kardos K, Kilmartin P, Gulati S, Citrano P, Booth RE. The alpha-defensin test for periprosthetic joint infection responds to a wide spectrum of organisms. *Clin Orthop Relat Res.* 2015;473:2229–2235. doi:10.1007/s11999-015-4152-x.
- [15] Sigmund IK, Holinka J, Gamper J, Staats K, Böhler C, Kubista B, et al. Qualitative α -defensin test (Synovasure) for the diagnosis of periprosthetic infection in revision total joint arthroplasty. *Bone Joint J.* 2017;99-B:66C72. doi:10.1302/0301-620X.99B1.BJJ-2016-0295.R1.
- [16] Fink B, Sevelde F. Periprosthetic joint infection of shoulder arthroplasties: diagnostic and treatment options. *BioMed Res Int.* 2017;2017:4582756. doi:10.1155/2017/4582756.
- [17] Ricchetti ET, Frangiamore SJ, Grosso MJ, Alolabi B, Saleh A, Bauer TW, et al. Diagnosis of periprosthetic infection after shoulder arthroplasty: a critical analysis review. *JBJS Rev.* 2013;1. doi:10.2106/JBJS.RVW.M.00055.
- [18] Parvizi J, Alijanipour P, Barberi EF, Hickok NJ, Phillips KS, Shapiro IM, et al. Novel developments in the prevention, diagnosis, and treatment of periprosthetic joint infections. *J Am Acad Orthop Surg.* 2015;23 Suppl:S32–S43. doi:10.5435/JAAOS-D-14-00455.

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Author: Anders Ekelund

QUESTION 8: Is there a role for serum D-dimer in the evaluation of periprosthetic joint infection (PJI) following shoulder arthroplasty?

RECOMMENDATION: Unknown. There is currently only limited evidence related to the evaluation of hip and knee PJI and no study to date evaluating its use in shoulder PJI.

LEVEL OF EVIDENCE: No Evidence

DELEGATE VOTE: Agree: 96%, Disagree: 4%, Abstain: 0% (Unanimous, Strongest Consensus)

RATIONALE

A literature review (Medline, PubMed) was performed to identify relevant studies on the role for serum D-dimer in shoulder arthroplasty infections. Terms used included “periprosthetic infection,” “shoulder infection,” “D-dimer,” “diagnosing PJI,” “serum biomarkers PJI.” D-dimer is a fibrin degradation product, a small protein present in the blood after a blood clot is degraded. The D-dimer test has been used for diagnosing thrombosis, pulmonary embolus and disseminated intravascular coagulation (DIC). Lippi et al. [1] found that in an urban population the most common reason for an elevated D-dimer was infection (15%).

There has been a growing interest in the use of serum biomarkers to diagnose periprosthetic joint infections, especially given the imperfect nature of erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) tests. A literature search found no studies regarding D-dimer and shoulder arthroplasty. There are however, reports in the hip and knee arthroplasty literature. Lee et al. [2] studied the postoperative levels of D-dimer after elective total hip arthroplasty. Only one paper was found regarding D-dimer as a diagnostic test for periprosthetic infection. Shahi et al. [3] reported on a prospective study of 245 patients undergoing primary arthroplasty (23), revision for aseptic failure (86), revision of PJI (57), reimplantation (29) and infection in a site other than a joint (50) (urinary

tract infection, pneumonia, upper respiratory infection). The study included only hip and knee arthroplasties. The median serum D-dimer was significantly higher for patients with PJI and the 850 ng/mL was determined as the optimal threshold value for serum D-dimer for the diagnosis of a PJI. The sensitivity (89%) and specificity (93%) for serum D-dimer was better than for ESR, CRP and ESR & CRP combined. An interesting finding was that D-dimer was elevated in cases of *C. acnes* infection, a common pathogen in the shoulder which typically does not cause elevation in serum ESR or CRP. The authors concluded that serum D-dimer is a promising marker for the diagnosis of PJI.

REFERENCES

- [1] Lippi G, Bonfanti L, Saccenti C, Cervellin G. Causes of elevated D-dimer in patients admitted to a large urban emergency department. *Eur J Intern Med.* 2014;25:45–48. doi:10.1016/j.ejim.2013.07.012.
- [2] Lee YS, Lee YK, Han SB, Nam CH, Parvizi J, Koo K-H. Natural progress of D-dimer following total joint arthroplasty: a baseline for the diagnosis of the early postoperative infection. *J Orthop Surg.* 2018;13:36. doi:10.1186/s13018-018-0730-4.
- [3] Shahi A, Kheir MM, Tarabichi M, Hosseinzadeh HRS, Tan TL, Parvizi J. Serum D-dimer test is promising for the diagnosis of periprosthetic joint infection and timing of reimplantation. *J Bone Joint Surg Am.* 2017;99:1419–1427. doi:10.2106/JBJS.16.01395.

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