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***Response to JBJS (A) 2019; 101:1144-50 (Hernandez, et al.) and 2019; 101: 1151-9 (Hart, et al.)***

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This letter was prepared as a response to JBJS (A) 2019; 101:1144-50 (Hernandez, et al.) and 2019; 101: 1151-9 (Hart, et al.) manuscripts related to povidone-iodine (PI) irrigation, prior to wound closure, following primary or revision total joint arthroplasty (TJA). It is important that the authors' efforts to publish a meaningful investigation related to the critical topic of periprosthetic joint infection (PJI) be recognized and lauded. Universally, PJI is accepted as the most devastating complication following TJA. Any measure that reduces PJI should be utilized and conversely, a detrimental modality should be avoided. The authors' of both of these Level III manuscripts conclude that PI irrigation has neither a positive nor negative influence on PJI following TJA. While we acknowledge the importance of these publications, we recognized several study weaknesses not identified in the Discussion Section of each work. Due to the incredible importance of the investigated topic, we believe our letter merits publication so that the readers can make an informed decision about the routine use of PI irrigation following TJA.

First, it must be understood that PI irrigation was used in only a fraction of the study subjects. An important unanswered question is, why was it used in certain cases? It is possible that the surgeon chose to use it in high risk cases such as when there was a breach in the sterile field? The diversity in the indications for use could have biased the results.

Second, it appears that some surgeons more routinely utilized PI irrigation and others rarely, if at all, used this intervention. Surgeon vs. surgeon infection rates are not considered in this study. This could create significant bias. For example, if Surgeon (A) had a high baseline infection incidence and frequently used

PI irrigation, but Surgeon (B) had a low incidence and did not use this modality, and during the study period their incidence of PJI equalized, it would appear that PI irrigation provided little benefit.

Conversely, PI irrigation may have greatly lowered the incidence of PJI for Surgeon (A).

Third, no discussion was made on surgical approaches for THA, as there is evidence that DAA may lead to a higher wound complication and superficial infections. In TKA there was no data on use of antibiotic impregnated cement, or other interventions such as the use of TXA that could have also influenced the PJI rate between the groups.

Fourth, as the overall size of the PI cohort is extremely small, there is a concern for a type II statistical error. This issue was not mentioned in the Discussion either.

Additionally, the author's acknowledged that use of PI irrigation increased annually during the study period. During this time, if institutional infection rates were increasing annually (due to some unrecognized issue), it would bias the results against use of PI irrigation. Consider the following hypothetical table.

	Year 1	Year 2	Year 3	Average
Institutional Infection Incidence	0.5%	1.0%	1.5%	1.0%
Number of Patients	1,000	1,000	1,000	1,000
% Receiving PI irrigation	20%	50%	80%	50%
Total # of patients with PJI	5	10	15	10
# of PJI without PI irrigation	3	6	6	5
# of PJI with PI irrigation	2	4	9	5

Using this data, the incidence of PJI in year 3 with the use of PI irrigation, was 1.2%, but without PI irrigation, it was 3.0%. While PI irrigation clearly was effective, the positive effect was mitigated by evaluating only the average three year values. A year by year analysis of PJI rates was not considered by the authors of these manuscripts. However, even if this issue was considered, it would be difficult to evaluate. For example, PJI could have been increasing, but kept at baseline levels due to use of PI irrigation.

Finally, and most importantly, the institution was not utilizing sterile PI for irrigation. Numerous studies have demonstrated that several microorganisms are capable of surviving in PI solution and in fact may contribute to the incidence of PJI, when utilized in a non-sterile state.

The authors of both manuscripts call for the need for more studies on this important topic. Specifically, Hernandez et al. states; “Randomized clinical trials should be performed to see if there is a role for dilute PI irrigation prior to wound closure.” However, they do not discourage use based on their research and in fact note, “until randomized clinical trials are completed, it is still the practice of many surgeons at our institution to use dilute PI irrigation prior to wound closure.” There have been a few randomized studies on the subject that are published and also pending publication that show great efficacy for PI solution. The latter was the reason behind both the Center for Disease Control and World Health Organization endorsing the use of sterile PI solution during ALL surgical procedures.

In summary, we submit this letter to encourage surgeons to continue utilizing PI irrigation until additional data is reported. It is a low cost and low risk intervention supported by an abundance of additional literature reporting its efficacy as a modality for reducing the incidence of surgical site infection.

Conflict of Interest: All authors are helping a commercial entity develop a dilute sterile betadine.