

Does An Isolated Elevated ESR Value Warrant Further Work-up for PJI Following THA?

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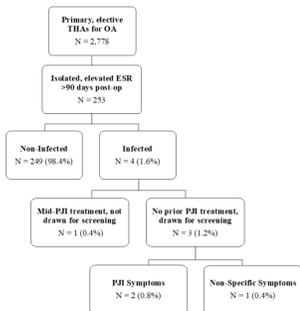
INTRODUCTION: Erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) are screening tools for periprosthetic joint infection (PJI) after total hip arthroplasty (THA). When both inflammatory markers are elevated, the probability of PJI is increased, prompting further diagnostic workup. In cases where clinical suspicion is low, the significance of an isolated, elevated ESR remains unclear. This study aimed to evaluate the incidence of PJI in THA patients with this specific serologic profile.

METHODS: A retrospective study of 2,778 primary, elective THAs between 2012 and 2022 identified 253 cases with elevated ESR (≥ 30 mm/hr) and normal CRP (≤ 10 mg/L) ≥ 90 days postoperatively. Data collected through chart review included presenting symptoms, inflammatory markers, and PJI diagnoses.

RESULTS: Of the 2,778 pTHAs included, 253 (9.1%) had an isolated, elevated ESR ≥ 90 days postoperatively. Of these 253 patients, one (0.4%) was already undergoing treatment for PJI and three (1.2%) were subsequently diagnosed with PJI. Of these three, two (0.8%) had clinical findings highly suspicious for PJI such as a large effusion and sudden-onset swelling. These two patients did not represent cases where a surgeon would encounter uncertainty regarding whether to pursue further testing. Leaving one patient—representing 0.4% of those with an isolated, elevated ESR—who was eventually diagnosed with PJI despite limited clinical concern beyond nonspecific pain. There was no significant difference in average ESR between the infected and non-infected cohorts, however the infected cohort had a significantly higher average CRP ($P=0.003$).

DISCUSSION AND CONCLUSION: An isolated, elevated ESR is common after primary THA (9.1%). This finding was associated with an extremely low risk of occult PJI. An isolated, elevated ESR does not mandate further PJI-workup in the absence of specific clinical concerns. Significant weight should be given to the presence or absence of additional PJI symptoms when deciding whether to pursue further testing.

Figure 1: Patient Flow Chart



THA, total hip arthroplasty; OA, osteoarthritis; ESR, erythrocyte sedimentation rate; Post-op, post-operatively; PJI, periprosthetic joint infection

Table 1: Patient Demographics

	Non-Infected (N=249)	Infected (N=4)	P-Value
Age (years), mean ± SD	64.9 ± 12.4	62.8 ± 14.8	0.446
BMI (kg/m ²), mean ± SD	31.4 ± 6.5	29.2 ± 3.4	0.250
Sex, n (%)			0.213
Female	191 (76.7)	2 (50)	
Male	58 (23.3)	2 (50)	
Race, n (%)			0.387
White	141 (56.6)	4 (100)	
Black of African American	66 (26.5)	0 (0)	
Asian or Indian	4 (1.6)	0 (0)	
Other	38 (15.3)	0 (0)	
Smoking Status, n (%)			0.837
Never	119 (47.8)	2 (50)	
Former	110 (44.2)	2 (50)	
Current	20 (8)	0 (0)	
ASA Score, n (%)			0.832
I	6 (2.4)	0 (0)	
II	180 (52.2)	3 (75)	
III	108 (43.4)	1 (25)	
IV	5 (2)	0 (0)	
CCL, mean ± SD	3.5 ± 2.7	2.8 ± 2.6	0.269
Primary Diagnosis, n (%)			0.825
Primary OA	246 (98.8)	4 (100)	
Post-Traumatic OA	3 (1.2)	0 (0)	
Follow-Up Since Surgery (years), mean ± SD, [range]	5.2 ± 2.7 [0.2-12.0]	5.3 ± 3.7 [3.2-10.9]	0.493
Follow-Up Since Isolated, Elevated ESR (years), mean ± SD, [range]	2.9 ± 2.2 [0.03-11.1]	3.4 ± 4.13 [1.1-9.7]	0.298

Kg, kilogram; m, meter; BMI, body mass index; ASA, American Society of Anesthesiologists; CCL, Charlson Comorbidity Index; OA, Osteoarthritis

Table 2: ESR and CRP Values

	Non-Infected (N=249)	Infected (N=4)	P-Value
ESR (mm/hr), mean ± SD	49.6 ± 19.9	54.8 ± 17.0	0.305
CRP (mg/L), mean ± SD	3.0 ± 2.6	6.7 ± 2.2	0.003

ESR, erythrocyte sedimentation rate; mm, millimeter; hr, hour; SD, standard deviation; CRP, C-Reactive Protein; mg, milligram; L, liter