

Can the use of a Multiplex PCR Joint Infection Panel reduce length of stay and use of antibiotics?

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Background:

- Many patients are evaluated in emergency care on the suspicion of septic arthritis or prosthetic joint infections.
- Confirmation of the diagnosis requires cultivation of joint aspirates which are time consuming
- Patients who are not infected receive unrequired antibiotics
- Emperic antibiotic therapy in our institution covers only Grampositive bacteria

Aims:

To investigate whether a commercially available multiplex PCR joint infection panel (JIP) could be used to:

- rule out infection in patients suspected of septic arthritis and periprosthetic joint infections and thereby potentially reduce the length of stay and reduce the use of antibiotics.
- reduce the time to targeted treatment in cases infected with bacteria not covered by the empirical treatment.

Materials and methods:

Retrospective cohort study from May 1, 2023, to May 1, 2025.

- 90 patients with suspected infection in prosthetic or native joints
- Joint aspirate cultured and analysed post hoc using the BioFire® Joint Infection Panel (BioMerieux, France)

Two patient groups:

- patients suspected of septic arthritis in native joints
- patients suspected of periprosthetic joint infections

	Native joints	Prosthetic joints	Total
Demographics			
Sex (male)	21 (66%)	37 (64%)	58 (64%)
Age, years (mean [SD])	58 [22]	67 [15]	64 [18]
Age, years (Median [Min, Max])	58 [1, 93]	68 [21, 99]	65.5 [1, 99]
Infection	9 (28%)	43 (74%)	52 (58%)
IV antibiotics upon admission	31 (97%)	47 (81%)	78 (87%)

Results:

- 52/90 patients were classified as infected based on positive cultures and clinical criteria.
- Agreement between culture results and the JIP in 77% of the cases
- 4/52 infected patients were false negative in the JIP
- 5/52 infected patients had negative cultures and positive results in the JIP. Results of 16s genome sequencing matched the results of the JIP.
- 6/52 (12%) infected patients had infections with pathogens not covered by empiric treatment
- Negative predictive value of the JIP was 68% in the entire population

NATIVE JOINTS

- The negative predictive value of the JIP was 82%, (CI 95%, 67%-96%)

PROSTHETIC JOINTS

- The negative predictive value of the JIP was 53%, (CI 95%, 32%-72%)

Joint infection Panel	Total (n=90)
<i>Candida albicans</i>	1
<i>Cutibacterium avidum</i>	1
<i>Enterococcus faecalis</i>	2
<i>Escherichia coli</i>	1
<i>Escherichia coli</i> + <i>Enterococcus faecalis</i>	1
<i>Finnegoldia magna</i>	1
<i>Kingella kingae</i>	1
<i>Klebsiella pneumoniae</i>	1
<i>Staphylococcus aureus</i>	7
<i>Staphylococcus aureus</i> + <i>peptoniphilus</i> sp.	1
<i>Staphylococcus aureus</i> + <i>Streptococcus</i> sp.	1
<i>Staphylococcus lugdunensis</i>	3
<i>Streptococcus agalactiae</i>	3
<i>Streptococcus</i> sp.	9
<i>Streptococcus</i> sp. + <i>Strep. pneumoniae</i>	1
Negative	56 (62%)

Microorganisms identified in joint aspirates by Joint Infection Panel

Cultivation	Total (n=90)
<i>Bacteroides fragilis</i>	1
<i>Candida albicans</i>	1
<i>Corynebacterium species</i>	1
<i>Corynebacterium striatum</i>	1
<i>Enterococcus faecalis</i>	1
<i>Escherichia coli</i>	3
<i>Klebsiella pneumoniae</i>	1
<i>Neisseria species</i>	1
<i>Propionibacterium species</i>	1
<i>Staphylococcus aureus</i>	12
<i>Staphylococcus capitis</i>	1
<i>Staphylococcus epidermidis</i>	3
<i>Staphylococcus lugdunensis</i>	3
<i>Streptococcus agalactiae</i>	2
<i>Streptococcus dysgalactiae</i>	10
<i>Streptococcus mitis</i>	1
Negative	47 (52%)

Microorganisms identified in joint aspirates by standard of care cultivation

CONCLUSION:

The Joint Infection Panel cannot be used to rule out infection and it can thereby not help reduce the use of antibiotics or length of stay.
It could potentially have reduced the time to targeted treatment in 12% of infected cases.

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