

SUPPLEMENTARY MATERIAL

Supplementary Material

Table i. Primers used in this study

Description	Primer sequence
Primers pair to amplify the bacterial 16S rRNA gene	Forward 5'-ATTAGATAC-CCTGGTAGTCCACGCC-3' Reverse 5'-CGTCATCCCCACCTTCCTCC-3'
As an internal reference, we amplified GAPDH using the following primers	Forward 5'-TCCCTGAGCTGACGGGAAAG-3' Reverse 5'-CGCCTGCTTCACCACCTTCT-3'

GAPDH, glyceraldehyde 3-phosphate dehydrogenase; rRNA, ribosomal RNA.

Table ii. Clinical data of patients with suspected infections

Characteristic	PJI	Non-PJI
Mean age, yrs (SD)	63.9 (6.5)	67.6 (9.3)
Sex, male/female, n	6/15	3/9
Surgical type, hip/knee, n	16/5	9/3
Initial arthroplasty reason, n		
Knee osteoarthritis	4	2
Rheumatoid arthritis	2	1
Femoral head necrosis	11	4
Hip osteoarthritis	1	3
Hip dysplasia	3	2

PJI, prosthetic joint infection.

Table iii. Comparison of diagnostic efficiency between culture and polymerase chain reaction

Detection method	Sensitivity	Specificity	PPV	NPV	Accuracy	LR+
Preoperative culture, % (95% CI)	28.6 (12.2 to 52.3)	83.3 (50.9 to 97.1)	75.0 (35.6 to 95.6)	40.0 (21.8 to 61.1)	48.5 (31.4 to 60.1)	1.71 (0.4 to 7.1)
RNA-based PCR, % (95% CI)	57.1 (34.4 to 77.4)	91.7 (59.8 to 99.6)	92.3 (62.1 to 99.6)	55.0 (32.0 to 76.2)	69.7 (54.0 to 80.4)	6.86 (1.0 to 46.4)
p-value	0.000*	0.133*	0.814†	0.085†	0.073†	N/A

*McNemar test.

†Chi-squared test.

CI, confidence interval; LR+, positive likelihood ratio; N/A, not applicable; NPV, negative predictive value; PCR, polymerase chain reaction; PPV, positive predictive value.

Table iv. Organisms of prosthetic joint infection detected by culture and polymerase chain reaction

Bacterial classification	Preoperative (n = 8)	Intraoperative (n = 17)	PCR (n = 12)
<i>Staphylococcus epidermidis</i>	3	6	<i>Staphylococcus</i> spp.: 4
<i>Staphylococcus aureus</i>	2	2	3
<i>Staphylococcus lugdunensis</i>	1	2	CoNS: 2
<i>Staphylococcus haemolyticus</i>	1	1	CoNS: 2
<i>Pseudomonas aeruginosa</i>	1	1	1
<i>Streptococcus</i> spp.	0	1	0
<i>Escherichia coli</i>	0	1	0
<i>Bacteroides fragilis</i>	0	1	1
<i>Enterobacter</i>	0	1	1
Multiple organisms	0	1	0

CoNS, coagulase-negative staphylococci; PCR, polymerase chain reaction.

Table v. Typical cases misdiagnosed by preoperative culture

Case	Age, yrs/sex	Diagnosis	Antibiotic duration	ESR	CRP	Preoperative aspirate				
						Volume/feature	Culture	rRNA-PCR	WBC, cells/ μ l	PMN%
1	88/F	THA infection	Not used	83	37.1	4 ml/bloody	-	+	800	60.1
2	71/M	THA infection	Not used	55	29.6	4 ml/yellow-sticky	-	+	9,770	82.3
3	45/M	THA infection	1 week	30	18.6	5 ml/purulent	-	+	7,420	71.3
4	84/F	TKA infection	5 days	80	9.85	3 ml/bloody	-	+	5,180	90.0
5	51/F	THA infection	4 weeks	40	16.5	4.5 ml/purulent	-	-	2,200	72.5
6	61/F	TKA infection	Not used	25	6.1	4 ml/bloody	<i>Bacillus subtilis</i>	-	980	57.3

THA, total hip arthroplasty; TKA, total knee arthroplasty; PCR, polymerase chain reaction; PMN, polymorphonuclear; rRNA, ribosomal RNA; WBC, white blood cell.

Table vi. Cases of false diagnosis by culture

Case	Intraoperative finding			Diagnosis	Revision procedure
	Frozen section (neutrophils, cells/HPF)	Gram stain	Culture		
1	4 to 5	0 organisms	<i>Bacteroides fragilis</i>	PJI	Two-stage
2	> 10	0 organisms	<i>Enterobacter</i>	PJI	Two-stage
3	> 10	Rare WBC, 0 organisms	N/A	PJI	Two-stage
4	> 5	0 organisms	N/A	PJI	Two-stage
5	> 20	Rare WBC, 0 organisms	N/A	PJI	Two-stage
6	2 to 3	0 organisms	N/A	Aseptic loosening	One-stage

HPF, high-power field; N/A, not applicable; PJI, prosthetic joint infection; WBC, white blood cell count.