

The Result of Standardized “No Touch Sampling Technique” Combine with BCB for Bone and Soft Tissue Infection

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Purpose

In this study, we hypothesized that the effectiveness of the “No Touch Sampling Technique” combined with the blood culture bottle (BCB) system is superior to the conventional swab culture in terms of required specimen amount and microbial identification rate. We also analyzed the pathogen spectrum and antimicrobial resistance patterns, as well as the coverage of commonly used dual antimicrobial regimens.

Methods

We analyzed the prospectively collected data of 77 cases that underwent primary revision surgical treatment for suspected or confirmed bone and soft tissue infection at our center in 2025. Each sample was collected using sterile, single-use instruments to inoculate one aerobic BCB and one anaerobic general BCB. We also collected one conventional swab sample from the identical area. Compare positivity rates between culture modalities; summarize overall pathogen spectrum, single-agent susceptibility rates, and standard dual-agent regimen coverage.

Results

The overall detection rate is 93.50% for primary revision surgery cases (72/77). Across 331 specimens, the positive rates for blood culture bottle inoculation and anaerobic culture were 74.32% (246/331) and 73.11% (242/331) respectively,

significantly higher than the 27.79% positive rate for swab culture (92/331) ($P<0.001$). The multi-pathogen detection rate was 34.72%, plateauing at a rate of 5 or more samples as the number of samples increased. Antimicrobial susceptibility patterns showed dual-drug combinations such as vancomycin + amikacin, vancomycin + meropenem, and vancomycin + rifampin demonstrate higher coverage rates.

Conclusions

“No Touch Sampling Technique” combined with a blood culture bottle is superior to the conventional swab culture. In the current context of biofilm/mixed infections involving staphylococci (including multiple coagulase-negative species) and Enterobacteriaceae/non-fermenting Gram-negative bacilli, glycopeptides, linezolid, amikacin, tigecycline, and carbapenems retain high activity; the empirical value of certain cephalosporins and traditional oral β -lactams has diminished.



Table 1: Number of Primary Revision Surgery Specimens and Culture Detection Rates

	Total Cases	Positive Cases	Uncultured Cases	Multi-Positive	Total Spes	Aerobic (%)	Anaerobic (%)	Conventional (%)	P Value
1	7	5 (71.42%)	0 (0.00%)	1 (20.00%)	7	5 (71.42%)	5 (71.42%)	2 (28.57%)	0.174
2	7	5 (71.42%)	2 (40.00%)	1 (20.00%)	14	7 (50.00%)	7 (50.00%)	1 (7.14%)	0.024
3	12	12 (100.00%)	2 (16.67%)	3 (25.00%)	36	31 (86.11%)	28 (71.79%)	10 (25.64%)	<0.001
4	12	11 (91.70%)	8 (72.73%)	4 (36.36%)	48	26 (54.17%)	23 (47.92%)	5 (10.42%)	<0.001
5	25	25 (100.00%)	9 (36.00%)	9 (36.00%)	125	93 (74.40%)	94 (75.20%)	39 (31.20%)	<0.001
6	4	4 (100.00%)	1 (25.00%)	0 (0.00%)	24	20 (83.33%)	19 (79.16%)	5 (20.83%)	<0.001
7	7	7 (100.00%)	3 (42.86%)	5 (71.43%)	49	44 (89.80%)	44 (89.80%)	20 (40.80%)	<0.001
8	1	1 (100.00%)	0 (0.00%)	1 (100.00%)	8	8 (100.00%)	8 (100.00%)	4 (50.00%)	0.008
9	0	0 (0.00%)	0 (0.00%)	0 (0.00%)	0	0 (0.00%)	0 (0.00%)	0 (0.00%)	NA
10	2	2 (100.00%)	1 (50.00%)	1 (50.00%)	20	12 (60.00%)	14 (70.00%)	6 (30.00%)	0.031
Total	77	72 (93.50%)	26 (36.11%)	25 (34.72%)	331	246 (74.32%)	242 (73.11%)	92 (27.79%)	<0.001