

Joint aspirates – time to positivity – lessons from the routine

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Introduction

Identification of bacterial agents of joint infection is laborious and not always successful. Multiple methods of sampling and processing are described. One of the aspects still under discussion is the length of incubation time needed for samples sent for microbiological analysis. Our own previous data suggest that an incubation time of five days is enough for aerobic incubation, at least if blood culture bottles are used for sample processing. However, there are no data on the time needed for the corresponding anaerobic bottles.

Materials and Methods

From April 2013 until July 2014 all joint aspirates which arrived in an aerobic/anaerobic pair of blood culture bottles were incubated for 14 days at 36°C in a FX-BACTEC blood culture bottle incubator (BD, Germany). Positive bottles were inoculated on blood agar, chocolate agar and McConkey Agar. In case of anaerobic bottles an anaerobic Schaedler agar was inoculated, too. Species identification was done using MALDI-TOF (microflex, Bruker, Germany). Results were documented and analysed regarding positivity, time to positivity, origin of sample and species identified.

Results

From April 2013 until July 2014 we received 286 joint aspirates in an aerobic and anaerobic blood culture bottle respectively. 181 (63.3%) contained knee joint aspirates, 75 (26.2%) contained hip joint aspirates. The remaining 30 patient samples were aspirates from shoulder (18, 6.3%) and spine (12, 4.2%). 36 (12.6%) aerobic bottles and 41 (14.35%) anaerobic bottles were positive. Five cases (10.8% of all positive cases) were only positive in an aerobic bottle, ten cases (21.7% of all positive cases) were only positive in an anaerobic bottle (data not shown). Altogether 46 patient samples were positive in at least one bottle.

Only one aerobic bottle signalled positive after day 5 (2.8% of positive aerobic bottles) whereas six anaerobic bottles signalled positive after day 5 (14.6% of positive anaerobic bottles). Most bottles signalled positive on day 1 (20 aerobic bottles and 16 anaerobic bottles respectively).

17 different species were identified. *S. epidermidis* was the most common single species (16 of 46) followed by *S. aureus* (6 of 46) and *Propionibacterium sp.* (5 of 46). All bottles containing *Propionibacterium sp.* signalled positive after day 5.

	No	%
Knee	181	63,29
Hip	75	26,22
Shoulder	18	6,29
Spine	12	4,20
Total	286	100

Table 1: Samples received (04/2013-07/2014)

	No aerobic bottles	%
negative	250	87,41
negative	250	
positive	36	12,59
positive day 0	9	
positive day 1	20	
positive day 2	3	
positive day 3	3	
positive day 14	1	
Total	286	100,00

Table 2: positive samples – aerobic bottle

	No anaerobic bottle	%
negative	245	85,66
negative	245	
positive	41	14,34
positive day 0	8	
positive day 1	16	
positive day 2	8	
positive day 5	3	
positive day 7	1	
positive day 8	1	
positive day 10	1	
positive day 11	1	
positive day 13	1	
positive day 14	1	
Total	286	100,00

Table 3: positive samples – anaerobic bottle

	Hip	Knee	Shoulder	Spine	Total
<i>S. epidermidis</i>	8	3	4	1	16
<i>S. aureus</i>	1	3	2		6
<i>Propionibacterium sp.</i>	2	1	2		5
<i>E. faecalis</i>		3		1	4
<i>K. pneumoniae</i>	1	1			2
<i>S. agalactiae</i>	1	1			2
<i>S. lentus</i>		1			1
<i>S. dysgalactiae</i>		1			1
<i>S. agalactiae</i>		1			1
<i>S. salivarius</i>		1			1
<i>E. coli</i>				1	1
<i>C. parapsilosis</i>		1			1
<i>S. mitis</i>		1			1
<i>G. haemolysans</i>	1				1
<i>M. testaceum</i>	1				1
<i>E. cloacae, E. faecium</i>				1	1
<i>P. aeruginosa</i>		1			1
Total	15	19	8	4	46

Table 4: species isolated

Conclusions

1. An incubation time of 5 days is not enough for anaerobic bottles. All propionibacteria would have been missed if incubation had been stopped after 5 days. 14 days of incubation seem to be more suitable.
2. Aerobic and anaerobic culture conditions are necessary simultaneously, because otherwise 10.8% and 21.7% of positive samples would have been missed.