UniversityHospital Heidelberg

Diagnosing infectious prosthesis loosening: How much incubation time is necessary?

***#S. Blatt, *B. Lehner, #S. Zimmermann, #&I. Burckhardt**

***Department for Orthopedics, University of Heidelberg, Heidelberg, Germany**

#Department for Infectious Diseases, Med. Microbiology and Hygiene, University of Heidelberg, Heidelberg, Germany

&corresponding author: irene.burckhardt@med.uni-heidelberg.de

Introduction and Purpose

One reason for prosthesis loosening is infection. Optimised treatment can only be achieved if the respective organism is successfully cultured, identified and susceptibility testing is performed. Ideally this is done before the prosthesis is removed by aspirating joint fluid and culturing it. Culture must combine high sensitivity with low risk of contamination and a reasonable hands-on time. Therefore we chose blood culture bottles as culture media.

The necessary incubation time for a successful culture is subject of an ongoing debate.

This study was intended to determine a reasonable incubation time using blood culture bottles.

Materials and Methods

From November 2009 until March 2011 221 joint fluid aspirates of out-patients were injected into BD Bactec PEDS plus bottles (recommended sample volume: 1-3ml) and subjected to an incubation time of at least 14 days in the incubator or until positive. Negative bottles (after 14 days of incubation) were subcultured and an aliquot saved for further investigations (16sDNA PCR). Cultured strains were identified using Maldi-Tof and susceptibility testing was performed using Vitek2 or agar diffusion (EUCAST 2012).

Results

Samples were stratified into two groups:

A) patients with a prosthesis and clinical symptoms in the respective joint (109 samples)

B) patients with joint disorders without a prosthesis (control group, 112 samples)

In group A 98 bottles signalled negative. 10 samples were positive within two days. One sample was positive after 8 days. In group B 96 bottles signalled negative. 15 samples were positive within 4 days of incubation. One additional sample was only positive in the subculture (M.luteus), however it could not be confirmed with 16sDNA PCR from the same bottle. Therefore we consider it to be a contamination. **All other subcultures and investigations using 16sDNA PCR did not yield any further positive samples**. Isolated bacteria were mainly staphylococci, however, streptococci and gram-negative bacteria could be identified, too.

growth / prosthesis	no	yes	TOTAL
yes (A)	98	11	**109**
no (B)	96	16*	**112**
TOTAL	**194**	**27**	**221**

Table1: no of samples of patients with or without prosthesis vs final culture result (*one bottle only positive on subculture)

Prosthesis?	Bacterial sp.	Time to positivity (days after arrival in lab)						TOTAL
		0	1	2	3	4	8	
yes	S. aureus	1		1				**2**
	S. capitis		1				1	**2**
	S. lugdunensis		1					**1**
	S. epidermidis		2					**2**
	Corynebact. sp.		1					**1**
	P. aeruginosa		1					**1**
	P. mirabilis		1					**1**
	E. faecalis		1					**1**
Total (yes)		1	8	1			1	**11**
no	MRSA		1					**1**
	S. haemolyticus				1			**1**
	S. aureus	2	4					**6**
	S. capitis			1				**1**
	K. pneumoniae		1					**1**
	S. epidermidis	1	1	1				**3**
	S. oralis					1		**1**
	Coag. neg. staph.		1					**1**
Total (no)		3	8	2	1	1		**15**
TOTAL		**4**	**16**	**3**	**1**	**1**	**1**	**26**

Table2: Bacterial spp. found in positive bottles vs day of positivity

Conclusions

1.The majority (23/26, 88%) of all positive samples became positive within 2 days.

2.Only one sample became positive after day 4.

3.We did not find convincing evidence for false negative bottles.

4.Comparable to blood cultures 5-7 days of incubation suffice for the detection of most of the pathogens (25/26, 96%).