Documentation of blood culture results

R A Howe, C J Bates, P Cowling, N Young, R C Spencer

Abstract

***Aims*—To evaluate the adequacy of documentation of blood culture results in patients' medical notes.**

***Methods*—A pro-forma was completed following review of medical notes at 24 and 48 hours after a blood culture had been reported as positive. The study was performed on blood cultures received at the Department of Microbiology, Royal Hallamshire Hospital, Sheffield, from two local hospitals. Two periods were studied: (A) May to June 1993 and (B) September to October 1993.**

***Results*—There were 43 results studied in period A and 79 in period B, giving a total of 122 results studied. Overall, 72 (59%) of 122 results were recorded in the medical notes at 24 hours. Of those results deemed highly significant, 40 (63%) of 63 were recorded. There was no significant difference in the documentation of results if the result was given personally or via the telephone. Nor was there any difference in documentation between different medical grades. Throughout the study there were six inaccurate records. The cumulative documentation over 48 hours of positive results was 54 (86%) of 63 of highly significant, 27 (69%) of 39 of uncertain significance, and 11 (55%) of 20 probable contaminant results.**

***Conclusions*—Documentation of blood culture results is currently suboptimal.**

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Positive blood cultures have a significant impact on the management of hospital patients. A study in 1986[1] showed that half of the patients yielding significant cultures commenced initial or altered antibiotic treatment on the basis of the results. Thus it would seem important that these results are documented in patients' medical notes. Following the initial provisional verbal report, there is an inevitable delay in dissemination of a final printed result caused by identification and sensitivity testing of the isolate. Therefore, during this time the written documentation in medical notes will be the only record for clinical staff. With the advent of increasing cross-cover when on call, full documentation in medical notes is essential in order that this information is available to all clinicians caring for the patient.

This study was performed in order to assess the level of documentation of blood culture results in patients' medical notes and to determine factors which affect documentation.

Department of Microbiology, Royal Hallamshire Hospital, Glossop Road, Sheffield S10 2JF
R A Howe
C J Bates
P Cowling
N Young
R C Spencer

Correspondence to:
Dr R A Howe.

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Methods

The study was performed on blood cultures received at the Department of Medical Microbiology at the Royal Hallamshire Hospital, Sheffield, from two local hospitals. The normal procedure at this laboratory is that if there is either a positive Gram film or subculture from a blood culture, a member of the medical microbiological staff contacts the clinical team caring for the patient to communicate the result and discuss the interpretation and management of the patient.

Documentation was studied over two periods: (A) May to June 1993 and (B) September to October 1993. For each positive result, a pro-forma (table 1) was completed. The isolate reported, the method of communication, and the clinician contacted were recorded. After discussion, the clinical significance was determined according to the clinical status of the patient, the number of bottles in a set showing growth, the period of time before growth was manifest, previous microbiological results, and the nature of the present result. Any antibiotic or other advice was also recorded. On the following day, a review of patients' medical notes was performed (day 1 review). Further information on the isolate was given to the clinicians, and this was recorded. On the third day, a review of the day 2 information was completed.

Communication of results, review of notes and completion of the pro-forma was performed, whenever possible, by the same microbiologist.

Where appropriate, the χ^2 test was used to test for statistical significance.

Results

There were 43 results studied in period A and 79 in period B. There was no significant difference in the distribution of blood culture results as judged by clinical significance (table 2).

The recording of positive results is shown in table 3. Overall, 72 (59%) of 122 results were documented by 24 hours. There was no significant difference in recording depending upon clinical significance at 24 hours. After 48 hours, however, documentation of highly significant results was improved at 86% and this was statistically significantly better ($p<0.01$) than recording of results that were probable contaminants (55%). Documentation was significantly ($p<0.5$) better in period B than in period A. The possible reasons for this are discussed.

The documentation of microbiological advice is shown in table 4. These results include only those cases in which advice was given.

Table 1 Blood culture audit pro-forma

Blood Culture Audit

DAY ONE	*Date*		*DAY TWO*	
Patient:	*Ward:*	*Hospital:*	*Patient:*	*Ward:*
Isolate:			*Isolate:*	
Discussion with clinicians:	*Telephone/Personal*		*Discussion with clinicians:*	*Telephone/Personal*
Grade:	*SR/REG/SHO/HO*		*Grade:*	*SR/REG/SHO/HO*
Isolate reported:			*Isolated reported:*	
Clinical significance:	*Highly significant/ Uncertain significance/ Probable contaminant*		*Clinical significance:*	*Highly significant/ Uncertain significance/ Probable contaminant*
Antibiotic advice:			*Antibiotic advice:*	
Other advice:			*Other advice:*	
DAY ONE REVIEW			*DAY TWO REVIEW*	
Record of positive blood culture:		*YES/NO*	*Record of positive blood culture:*	*YES/NO*
Isolate recorded:			*Isolate recorded:*	
Record of clinical significance:	*Highly significant/ Uncertain significance/ Probable contaminant/ Not recorded*		*Record of clinical significance:*	*Highly significant/ Uncertain significance/ Probable contaminant/ Not recorded*
Record of antibiotic advice:	*If YES what?*	*YES/NO*	*Record of antibiotic advice:*	*If Yes what?* *YES/NO*
Other advice recorded:	*YES/NO*		*Other advice recorded:*	*YES/NO*

The types of "other advice" given included: "look for an abdominal site of sepsis" in the case of cultures growing Gram negative bacilli; or "repeat cultures" in the case of a probable contaminant. The high rate of recording of other advice in probable contaminants may be spurious because of the low numbers or may be because the advice "repeat cultures" is particularly likely to be recorded.

Table 2 Distribution of blood culture results by clinical significance

Clinical significance	*Period A (%)*	*Period B (%)*	*Overall (%)*
Highly significant	24 (56)	39 (49)	63 (52)
Uncertain significance	12 (28)	27 (34)	39 (32)
Probable contaminant	7 (16)	13 (17)	20 (16)
Total	43	79	122

Table 3 Recording of blood culture results by clinical significance

	24 hour review			*48 hour review*
Clinical significance	*Period A (%)*	*Period B (%)*	*Total (%)*	*Total (%)*
Highly significant	12/24 (50)	28/39 (72)	40/63 (63)	54/63 (86)
Uncertain significance	4/12 (33)	17/27 (63)	21/39 (54)	27/39 (69)
Probable contaminant	4/7 (57)	7/13 (54)	11/20 (55)	11/20 (55)
Total	20/43 (47)	52/79 (66)	72/122 (59)	92/122 (75)

It was felt that the method of communication may be a factor determining the level of documentation. As can be seen from table 5, overall documentation was slightly better when the results were given in person: 40 (65%) of 62 as opposed to via the telephone 31 (52%) of 60. However, none of these differences was statistically significant.

The grade of the clinician with whom the result was discussed was also recorded. Predictably, 90% of results were discussed with more junior medical staff (that is, registrar, senior house officer or junior house officer). There was no significant difference in the recording of results depending on medical grade of the person with whom the result was discussed.

There were a number of cases at both the 24 and 48 hour reviews where the record in the medical notes was not entirely accurate. Five of these cases occurred in the recording of staphylococcal infection and could be misleading (for example, a report of "two different coagulase negative staphylococci" recorded as "2 *S aureus* (coag-ve)—different—? significance"). This would appear to indicate confusion among some clinical staff as to the importance of the coagulase test in differ-

Table 4 Recording of microbiological advice at 24 hour review

Clinical significance	Antibiotic advice			Other advice		
	Period A (%)	Period B (%)	Total (%)	Period A (%)	Period B (%)	Total (%)
Highly significant	10/24 (42)	21/37 (57)	31/61 (51)	3/8 (38)	4/9 (44)	7/17 (41)
Uncertain significance	3/11 (27)	14/27 (52)	17/38 (45)	0/1 (0)	2/6 (33)	2/7 (29)
Probable contaminant	1/6 (17)	5/12 (42)	6/18 (33)	1/1 (100)	2/2 (100)	3/3 (100)

Table 5 Recording of blood culture results at 24 hour review according to method of communication

Clinical significance	Period A		Period B		Overall	
	Phone (%)	Personal (%)	Phone (%)	Personal (%)	Phone (%)	Personal (%)
Highly significant	5/13 (38)	6/11 (55)	14/18 (78)	14/21 (67)	19/31 (61)	20/32 (66)
Uncertain significance	1/6 (17)	3/6 (50)	9/16 (56)	8/11 (73)	10/22 (45)	11/17 (65)
Probable contaminant	0/2 (0)	4/5 (80)	2/5 (40)	5/8 (63)	2/7 (29)	9/13 (69)
Total	6/21 (29)	13/22 (59)	25/39 (64)	27/40 (68)	31/60 (52)	40/62 (65)

entiating the usually virulent *Staphylococcus aureus* from the often inconsequential coagulase negative staphylococci.

Discussion

The results of documentation were disappointing. Over both study periods, only 63% of highly significant results were accurately recorded in medical notes, and documentation of antibiotic and other advice was worse. Thus, in nearly 40% of cases a covering clinician, when called to see an ill patient at night, may not have any indication of a highly significant positive blood culture result. In addition, there is unlikely to be a record of suggested management. For isolates of uncertain clinical significance, the antibiotic advice given was often a suggestion of treatment to be started if the patient became unwell. It is obviously disappointing that such information was recorded in only 45% of cases.

Periods A and B were chosen in order to sample two different clinical "houses". It was expected that the difference between documentation over the different periods would be because of greater recording in period B by new house officers. However, there was improved recording of results across all medical grades in period B. One possible explanation is that it is often the junior house officer who actually writes in the patient's notes. The survey was concerned with the grade of clinician informed of the result and not the clinician by whom it was recorded. Thus it may still be true that the greater diligence of new house officers in period B was responsible for the higher level of documentation. The same microbiologists were involved in dissemination of results in both study periods and thus the improved documentation in period B remains to be explained.

It is already impossible in some circumstances to communicate blood culture results in person—for example, some laboratories provide microbiological services for distant hospital units.

Although they do not reach statistical significance, our results do suggest improved recording of personally communicated results. With the increasing moves towards rationalisation of pathology services by establishing large centralised laboratories, there will inevitably be a loss of personal contact and perhaps therefore a deterioration in this aspect of the service.

The results of this survey have been circulated to the appropriate clinicians. Discussions continue as to the most effective mechanism to improve documentation in patients' medical notes.

1 Holliman RE. The therapeutic impact of blood culture results. *J Hosp Infect* 1986;7:185–8.