


### Diagnosis of peritonitis

Diagnosis of peritonitis in patients receiving continuous ambulatory peritoneal dialysis (CAPD) is important in terms of patient management and effective chemotherapy. Various methods have been introduced to improve isolation rates such as filtration, pour plates, and broth enrichment cultures. 1–4 Peritoneal dialysis effluents (PDE) may contain very small numbers of organisms. 5 It has been suggested that bacteria may reside inside phagocytes in some cases of apparently culture negative peritonitis. 6 To investigate this possibility further we compared the results of PDE cultures before and after cell lysis with saponin.

Diagnostic samples of PDE were obtained from 33 consecutive CAPD patients presenting with peritonitis—that is, a cloudy PDE and one or more of the following: (i) symptoms of peritonitis; (ii) PDE white cell count (> 50%) neutrophils; (iii) positive dialysate culture. After centrifugation a Gram stain was performed on the spun deposit which was then divided into two aliquots. The first aliquot was inoculated by placing one drop of the deposit on to aerobic and anaerobic blood agar plates, a McConkey agar plate, and a diagnostic sensitivity test plate for sensitivity testing. To the second aliquot 4 drops of 10% saponin were added and the mixture allowed to stand at room temperature for five minutes. Culture plates were inoculated in an identical manner to that of the first aliquot. Plates were examined for growth after 18 hours of incubation, then reincubated for a further 24 hours. All organisms were identified by standard methods.

The table compares the isolation rates by the two methods. Saponin lysis of the cells in the deposit resulted in the isolation of organisms from three specimens in which the conventional culture was negative. Thus saponin lysis added 9% to the specimen positivity rate (64% to 73%). Secondly, additional organisms were detected in two specimens using saponin, one of these was an anaerobe and of particular importance.

We found that when identical organisms were cultured by both methods, the number of organisms was always higher in the material treated with saponin. In many cases these cultures showed confluent growth on the droplet area whereas conventional culture yielded three to four colonies. The increased numbers of organisms permitted more rapid and reliable direct sensitivity testing.

Our results strongly suggest that significant numbers of bacteria reside intracellularly in specimens of PDE and that they can be released for culture by lysis of the cells. Although our culture positive rate is lower than some centres, particularly those using broth enrichment methods, use of saponin allows a culture and sensitivity result to be obtained within 18 hours of receiving the specimen, considerably faster than when using broth enrichment. The use of larger volumes of PDE fluid may further improve the positivity rate. The use of lytic agents may have applications for the culture of other purulent body fluids.

### Table: Comparison of cultural results on 33 consecutive diagnostic peritoneal dialysis effluents

<table>
<thead>
<tr>
<th>Category</th>
<th>No (%)</th>
<th>Conventional</th>
<th>With saponin</th>
</tr>
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<tbody>
<tr>
<td>Growth on only one medium (MAC) by conventional methods; growth on both media after saponin</td>
<td>6 (18.2)</td>
<td>S epidermidis (3) Bacillus sp Enterobacter cloacae S aureus</td>
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<tr>
<td>Growth enhanced by saponin treatment</td>
<td>13 (39.4)</td>
<td>S epidermidis (7) S aureus (2) S saprophyticus S faecalis S bivis C freundii</td>
<td>S epidermidis (7) S aureus (2) S saprophyticus S faecalis S bivis C freundii</td>
</tr>
<tr>
<td>Growth after saponin; treatment no growth by conventional methods</td>
<td>3 (9.1)</td>
<td>Klebsiella aerogenes</td>
<td>S saprophyticus S aureus Diphtheroids</td>
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<tr>
<td>Additional organisms after saponin treatment</td>
<td>2 (6.1)</td>
<td>Ps maltophilia</td>
<td>Klebsiella aerogenes plus B fragilis Ps maltophilia plus Enterobacter cloacae</td>
</tr>
</tbody>
</table>

Of the remaining nine specimens, eight (24.2%) were sterile by both methods of culture and 1 (3%) grew diphtheroids in identical numbers by both techniques.

Key: S epidermidis = *Staphylococcus epidermidis*; S saprophyticus = *Staphylococcus saprophyticus*; Ps maltophilia = *Pseudomonas maltophilia*; B fragilis = *Bacteroides fragilis*; C freundii = *Citrobacter freundii*.

### References


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