Technical methods

A 'dip-slide' method of sampling bacteria for measuring the efficacy of antiseptics used in labour

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There are several methods available for sampling the bacterial flora of the skin. These include skin biopsy, agar contact plates (Selwyn and Ellis, 1972), the cylinder scrub technique (Williamson and Kligman, 1965), and standardised swabbing (Evans, 1975). All these techniques are impracticable for the quantitative sampling of areas of inaccessible or delicate skin such as the perineum.

A method based on contact plate sampling using a modified 'dip-slide' has been devised and used in a preliminary trial to measure the recoverable microbial flora of the perineum before and after the application of four antiseptics during childbirth.

Material and methods

SAMPLING OF THE PERINEUM

Dip slide kits manufactured by Oxoid Limited and primarily designed for the bacteriological examination of urine were modified for sampling the perineum. The dip slide kit consists of a special plastic slide with selective agars of 5.6 cm² surface area on each side. The whole slide is enclosed in a protective plastic bottle which allows easy observation of the bacterial growth.

The media already on the dip slide were removed with a sterile spatula and replaced on one side only with 1.5 ml 7% horse blood agar containing 1% Tween 80 and 0.1% lecithin as antiseptic neutralising agents. This whole operation was carried out in the sterile atmosphere of a laminar flow work station. The efficacy of the neutralising agent was tested by comparing the growth of colonies taken by replica plating on agar containing both antiseptics and antiseptics with neutraliser. There was no difference in the number of colonies which were recovered on plates with antiseptics plus neutralisers compared with the blood agar controls.

The surface of the perineum was sampled by

removing the slide from its container and pressing the surface of the blood agar firmly on to the skin surface for approximately two seconds, avoiding any movement of the slide when in contact with the skin. The slide was replaced in its container and incubated at 37°C for 24 hours before the total number of colonies was counted.

ANTISEPTICS USED

- (a) 4.8% w/v 4-chloro-3, 5-xenolol (Dettol) as a 2.5% v/v aqueous solution.
- (b) 15% w/v Cetrimide, 1.5% chlorhexidine (Savlon Hospital Concentrate) as a 1% v/v aqueous solution.
- (c) 20% w/v chlorhexidine gluconate (Hibitane) as a 0.25% v/v aqueous solution.
- (d) 12% w/v 4-chloro-3, 5-xenolol with 21% w/v EDTA as the dihydrate of its sodium salt (Dettol Chelate Antiseptic Concentrate) as a 1% v/v aqueous solution.

Each antiseptic was applied to the perineum by dabbing with a saturated cotton wool swab for approximately 10 seconds.

Wherever Dettol or Dettol Chelate were used, Dettol Obstetric Cream was used for vaginal examinations, and where Savlon and Hibitane were used, Hibitane Obstetric Cream was employed.

SAMPLING FREQUENCY

A total of 116 patients were examined during a period of three months, approximately equal numbers being treated with each antiseptic. The surface of the perineum was sampled (a) immediately after admission; (b) two minutes after each subsequent application of antiseptic; and (c) as near to the actual time of delivery as possible.

Results

The maximum number of colonies which could be comfortably counted on the surface of the dip slide was 500, representing approximately 100 micro-organisms per square centimetre of skin surface. All slides were counted by the same operator.

The results given in the Figure show that the use of antiseptics is associated with a reduction in the number of organisms on the surface of the perineum. A detailed comparison cannot be made as the time

Figure Effect of four antiseptics on the natural flora of the perineum. The percentage of patients having bacterial counts within the ranges indicated on sampling at admission and at birth are shown.

interval between the first and final sampling varied from patient to patient, depending on the number of examinations made.

The results obtained for each antiseptic were examined statistically by means of a ranking test. The Kruskal Wallance analysis of variance (Siegel, 1956) was used to examine the data. The bacterial count obtained before and after each treatment was ranked, and the total rank score for each set of data was compared to determine whether statistically significant differences occurred between them. It was found that:

- (a) No significant difference existed between the initial counts before application of each antiseptic, thus showing random allocation to each group.

- (b) There was a significant reduction ($P < 0.001$) in the number of bacteria present on the perineum between admission and delivery in patients treated with all four antiseptics.

Discussion

Agar contact plate methods have been reported (Selwyn and Ellis, 1972) to be unsuitable for the isolation of flora from the skin, giving a recovery of $<0.2\%$ of microorganisms which can be detected by a skin excision method. In general this is true, although on moist areas of skin such as the perineum we have shown that large numbers of bacteria can be recovered. In these areas, which are difficult to sample by more conventional methods, the dip slide technique offers certain advantages. It causes no distress to the patient, it is quick and easy to use, and no reaction from either the sampling or the application of the antiseptics was observed.

The method described here has shown itself capable of detecting changes in the numbers of recoverable bacteria from the perineum after the use of antiseptics during labour. Although for ethical reasons untreated controls were not included in this trial, the technique can easily be applied to a full study where childbirth is not involved, allowing much greater control of the conditions.

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