

# Antibiotic prophylaxis against infective endocarditis after normal delivery — is it necessary?

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**SUMMARY** During the years 1959 to 1978 inclusive 2165 women with rheumatic or congenital heart disease had vaginal deliveries at three large Dublin maternity hospitals. There were two (0.09%) cases of puerperal infective endocarditis, neither of which was unequivocally related to preceding childbirth during this period. Routine peripartum antibiotic prophylaxis was not given to either.

A questionnaire of the practice of 19 obstetricians in Ireland showed that 12 (63%) gave antibiotics routinely during labour and after delivery in cardiac patients, five (26%) did not, and two (11%) used them occasionally.

Peripheral vein blood was drawn serially from 0 to 30 minutes after vaginal delivery to determine the incidence of asymptomatic puerperal bacteraemia. A total of 299 cultures was obtained from 83 normal women and single blood cultures were positive in three women (3.6% of patients, 1.0% of cultures).

A review of the published reports showed that well-documented cases of infective endocarditis and of asymptomatic puerperal bacteraemia after normal vaginal delivery are uncommon. There is evidence that antibiotic prophylaxis may increase the risk of developing antibiotic-resistant endocarditis. Recommended prophylactic regimens carry a considerable risk of drug toxicity. These facts, coupled with a lack of direct evidence in support of the efficacy of antibiotic prophylaxis, suggest that routine peripartum antibiotic prophylaxis is not indicated.

The occurrence of infective endocarditis after abortion,<sup>1-3</sup> the insertion of intrauterine contraceptive devices,<sup>4,5</sup> and vaginal delivery<sup>6-10</sup> is used as support for routine antibiotic prophylaxis during normal labour and childbirth in patients with known heart disease. Published work provides little evidence for the need, and none for the efficacy of antibiotics in preventing endocarditis.

Prophylactic antibiotics have not been given routinely at delivery of cardiac patients at the National Maternity, Coombe Lying-In, and Rotunda Maternity Hospitals, Dublin, during the years 1959 to 1978. This report consists of three parts:

- (a) A survey by questionnaire in which obstetricians working in Ireland were asked about their practice in this regard.
- (b) An investigation of the incidence of asymptomatic bacteraemia after vaginal delivery in a group of normal women.

- (c) A brief review of cases of infective endocarditis which occurred after delivery without antibiotic prophylaxis.

## Subjects and methods

Details of pregnancies complicated by heart disease and cases of postpartum endocarditis were obtained from the Dublin Maternity Hospitals Annual Reports 1959 to 1978.<sup>11</sup>

A questionnaire containing the following three questions was sent to 19 obstetricians in Ireland:

- (a) Do you routinely prescribe antibiotics during labour and the puerperium in cardiac patients?
- (b) If yes, please give details.
- (c) Has there been a case of infective endocarditis after delivery at your unit during the past five years?

Fifty non-cardiac patients had four blood cultures each, taken immediately after placental separation and five, 10, and 30 minutes later. Thirty-three patients had three cultures each,

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one taken at placental separation and two within the following 10 minutes. Patients with prolonged rupture of membranes, those with overt infection, or those already taking antibiotics were excluded from the study. Five patients had forceps delivery, four had manual removal of the placenta, and the remainder had uncomplicated vaginal deliveries. Antecubital venepuncture was performed under aseptic conditions; 5 ml blood were placed in culture bottles containing fluid thioglycollate medium. Bottles were incubated at 37°C and subcultures onto blood agar plates, incubated aerobically and anaerobically, were made within 24 hours and again at 48 hours, 72 hours, and 10 days. Growths were Gram-stained and identified.

## Results

At the National Maternity, Coombe Lying-In, and Rotunda Hospitals, Dublin, during the years 1959 to 1978 inclusive, 2165 women with rheumatic or congenital heart disease had vaginal deliveries. Nineteen obstetricians (100%) replied to the questionnaire. Twelve (63%) gave antibiotics routinely, five (26%) did not, and two (11%) used them occasionally, for example for instrumental delivery. Among those who used antibiotics routinely, nine gave oral ampicillin during labour and for five days post partum; three did not state their choice of antibiotic. Only two respondents gave details of dosage; both used ampicillin 250 mg four times daily.

Three blood cultures were positive from a total of 299 obtained from 83 patients, giving a positive isolation rate of 3.61 per cent for patients and 0.1 per cent for cultures. The three positive cultures were all from different patients. One grew anaerobic Gram-negative bacilli and two a mixed growth. One of the positive cultures was obtained from a patient who had a manual removal; the other two were

obtained after uncomplicated vaginal deliveries. All were considered to be of doubtful significance.

Two cases of endocarditis had been recorded after vaginal delivery (Table 1). Neither had had antibiotic prophylaxis. The diagnosis was based on clinical features without confirmation by positive blood cultures and in each case a manual removal had been performed. An additional case of possible puerperal endocarditis in which prophylactic antibiotics had been used was reported in the survey by questionnaire.

## Discussion

The results of the survey by questionnaire confirm the divergence of opinion on the need for routine antibiotic prophylaxis after normal vaginal delivery.

The low rate of isolation of bacteria in the present study highlights the infrequency of asymptomatic puerperal bacteraemia. Even though the possible transience of bacteraemic peaks and subliminal concentrations of bacteria in blood may lead to underestimation of its true incidence,<sup>13</sup> substantial bacteraemia was not seen to occur in any patient.

Table 2 compares the incidence of puerperal bacteraemia in the present study with the incidence in four published series.<sup>14-17</sup> Thirty-six patients from a combined total of 1116 had positive cultures (3.23%). Twelve of these patients, however, had concurrent symptomatic infections giving a true incidence of asymptomatic puerperal bacteraemia after vaginal delivery of 2.15 per cent. In contrast to this, peripheral blood bacterial isolation rates after dental extraction have varied from 60 per cent<sup>18</sup> to 90 per cent<sup>13</sup> and after genitourinary tract manipulation from 7.3 per cent<sup>19</sup> to 85.9 per cent.<sup>20</sup> Isolation rates of this magnitude place cardiac patients at considerable risk of contracting endocarditis and fully justify routine antibiotic prophylaxis. The argument of high risk based on bacterial isolation rates cannot be used to justify routine prophylaxis after normal delivery of cardiac patients, however. Moreover, such routine prophylaxis may be harmful. Antibiotic resistance occurs in buccal commensal flora within 48 hours of administration<sup>21</sup> and resistant streptococci persist in diminished numbers for several weeks,<sup>22</sup> thereby enhancing the risk of antibiotic-resistant endocarditis. Additional evidence to support a policy of non-administration of routine prophylactic antibiotics comes from Marquis at the Simpson Memorial Maternity Pavilion, Edinburgh.<sup>23</sup> In that hospital, peripartum antibiotic prophylaxis is only given when sepsis is suspected but infective endocarditis has not occurred after delivery in

Table 1 *Clinical details of two cases of infective endocarditis which occurred after vaginal delivery without antibiotic prophylaxis*

| Case no. | Age at diagnosis (y) | Interval between delivery and diagnosis (h) | Heart lesion and NYHA grade <sup>11</sup> | Blood culture | Maternal outcome |
|----------|----------------------|---|---|---------------|------------------|
| 1        | 33                   | 12  | +MS MR grade IV                           | Negative      | Recovery         |
| 2        | 29                   | 48  | MS MR grade IV                            | Negative      | Recovery         |

+MS, mitral stenosis; MR, mitral regurgitation. [NYHA, New York Heart Association.

Table 2 Incidence of puerperal bacteraemia in 1121 patients: present series and review of published reports

| Authors                            | Year | No. of patients | Blood cultures |  |      | Per cent positive  | Organisms isolated |
|------------------------------------|------|-----------------|----------------|--|------|--|--------------------|
|                                    |      |                 | Total no.      | Time   |      |  |                    |
| Burwell and Metcalfe <sup>14</sup> | 1948 | 17              | 74             | Not stated                                       |      | —  |                    |
| Readleaf and Fadell <sup>15</sup>  | 1959 | 101             | 202            | At delivery; within 24 h                         | 7.2  | Micrococcus and haemolytic streptococcus                             |                    |
| Baker <i>et al.</i> <sup>16</sup>  | 1966 | 396             | 1779           | At delivery; 12, 24, 48 h                        | 0.39 | <i>Esch coli</i> , <i>Aerobacter pseudomonas</i>                     |                    |
| Baker and Hubbell <sup>17</sup>    | 1967 | 519             | 2583           | Delivery of placenta; 15 min, 30 min, 12 h, 24 h | 0.77 | <i>Esch coli</i> , <i>Strep. viridans</i> , bacteroides, pseudomonas |                    |
| Present series                     | 1979 | 83              | 299            | Within 30 min of delivery                        | 0.1  | Anaerobic Gram-negative bacilli, mixed growth                        |                    |

over 1750 cardiac patients during a 25-year period.

Review of the published reports showed a total of 27 cases of endocarditis after uncomplicated vaginal delivery.<sup>6-11 24</sup> The causative role of delivery in precipitating endocarditis was equivocal in many instances. It is noteworthy that both cases of postpartum endocarditis in the present series were culture negative, and in one instance the diagnosis was made within 12 hours of delivery, thereby casting some doubt on the causative role of this. The specific hazard of enterococcal endocarditis after delivery has been cited as evidence in favour of routine peripartum antibiotic prophylaxis.<sup>25 26</sup> Eleven cases of pregnancy-related enterococcal endocarditis have been reported,<sup>24 27 28</sup> but only one was unequivocally related to normal childbirth.<sup>24</sup> The remaining cases followed abortion, caesarean section, or occurred during pregnancy.<sup>27 28</sup>

The occurrence of both cases of endocarditis and one case of asymptomatic bacteraemia after manual removal of the placenta suggests that this procedure does carry an increased risk of endocarditis. Two additional cases of endocarditis after manual removal have been reported.<sup>9</sup> It is prudent therefore to give antibiotic prophylaxis in this situation. The regimen recommended by the American Heart Association<sup>29</sup> is appropriate for this, that is penicillin G 2 000 000 units intramuscularly plus gentamicin 80 mg intramuscularly, or ampicillin 1 g intramuscularly or intravenously 30 minutes before the procedure. Vancomycin 1 g by intravenous infusion over 30 minutes plus streptomycin 1 g intramuscularly may be given to patients who are allergic to penicillin. The use of streptomycin however carries a risk of vestibular damage, a risk to which there is considerable individual variation in susceptibility and which is not entirely dose related.<sup>30</sup>

In the absence of any evidence in support of routine prophylaxis at normal delivery, coupled with the possible hazards of such a policy, we feel

that this is not indicated in patients with heart disease.

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