

# Bacteria Isolated from Post-Partum Infections

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## Abstract

**Objective:** This study was undertaken with an aim to determine bacterial species involved in post partum infections and also their abundance in patients admitted to at Khanevadeh hospital. In this study out of three different kinds of postpartum infections (i.e. genital, breast and urinary tract), only genital infection is considered.

**Materials and Methods:** Post partum infection among 6077 patients (inpatients and re-admitted patients) of Khanevadeh hospital from 2003 till 2008 was studied in this descriptive study. Samples were collected from patients for laboratory diagnosis to find out the causative organisms.

**Results:** Follow up of mothers after delivery revealed 7.59% (461 patients) had post partum infection, out of which 1.03% (63 patients) were re- hospitalized.

Infection was more often among younger mothers. Bacteria isolated and identified were both aerobic and anaerobic cocci and bacilli, majority of which were normal flora of the site of infection. Though, some pathogenic bacteria like *Staphylococcus aureus*, *Neisseria gonorrhea*, *Chlamydia trachomatis*, were also the causative agents. The commonest infection was infection at the site of episiotomy.

**Conclusion:** Puerperal infection was detected in of 7.59% mothers. Bacteria isolated were both aerobic and anaerobic cocci and bacilli, majority of which were normal flora. However; some pathogenic bacteria were isolated.

**Keywords:** Puerperal infection, Post partum morbidity, Bacterial infection

## Introduction

Most of the post partum and non- obstetrical infections occur after hospital discharge (1).

Puerperal infection is a general term used to describe any bacterial infection of the genital and reproductive system which along with pre-eclampsia and obstetrical hemorrhage constitutes the lethal triad of

causes of maternal death for many decades (2).

Infection made up 13% of pregnancy related deaths and was the fifth leading cause of death. In majority of instances bacteria responsible for postpartum infection are those that normally reside in the bowel (2). Most female pelvic infections are caused by bacteria indigenous to the female genital tract. This study was undertaken with an aim to determine bacterial species involved in post partum infections and also their abundance in patients admitted to at Khanevadeh hospital. In this study out of three different kinds of postpartum infections (i.e. genital,

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breast and urinary tract), only genital infection is considered.

## Materials and methods

The study population of this descriptive project consisted of all women admitted during a 6 year period (from 2003 – 2008) to Khanevadeh hospital for delivery (vaginal or cesarean section). They were followed for post partum infection, leading to re-hospitalization in some cases.

Specimens were collected according to the site of infection to find out the causative organisms.

A total of 6077 deliveries were recorded from 2003 till 2008 in the above mentioned hospitals. Follow up shows that 7.59% (n=461) cases suffering from infection and 1.03% (n=63) of total cases were re-admitted. In our study, only genital infection and infection at the site of episiotomy were considered.

Collected samples from cervix, vagina, and site of episiotomy (containing vaginal / cervical secretions, foul smelling pus and infection in mucous membrane) were tested in the laboratory. Laboratory diagnosis was made for both culturing aerobic and non-aerobic bacteria. Smears prepared were gram stained and microscopically examined. Shape and pigment of the colony growing on agar containing media and biochemical/ serological tests were used for laboratory diagnosis.

Staphylococcus was identified on the basis of gram staining and colony characteristics.

In order to identify Streptococci, gram stained smear were prepared, confirmed by growth characteristics on blood agar and biochemical findings. Optochin and CAMP. (Christie, Atkins, Munch & Peterson) tests were performed for the species identification

Neisseria gonorrhoeae was identified by observing

gram negative diplococci in stained smears and confirmed by its culture on Thayer-Martin agar (3). Gardnerella vaginalis was identified by presence of clue cells in wet preparation and gram stained smears. Chlamydia trachomatis was identified serologically by Enzyme-Linked Immunosorbent Assay (ELISA) using Dako Diagnostic Kit. Mycoplasma hominis and Ureaplasma were cultured on PPLO (Pleuro Pneumonia Like Organisms) medium for identification.

Clostridium was identified on the basis of gram staining, culture on blood agar under anaerobic conditions and biochemical characteristics. Bacteroides species were diagnosed on the basis of direct microscopy and cultured on bile esculin agar (BBE).

Bacteria belonging to family Enterobacteriaceae like E.coli, Proteus, Enterobacter, and Klebsiella were identified on the basis of colony as well as biochemical characteristics (4). Identification of anaerobic bacteria in the hospital laboratory is not a routine diagnostic work and was done by request.

## Results

As is clear from Table 1, among re-admitted cases common age group ranged from 20 – 24 years and least common age varies from 40 – 44 years. Out of 6077 deliveries 7.59% of cases (n=461) were infected and 1.03% cases (n=63) were readmitted.

Infection was noticed as post partum complication among readmitted mothers with the highest incidence at the age of 20 – 29 years (i.e. 20 – 24 & 25 – 29 yr). Infected site varied and the site of episiotomy was the commonest site of infection in readmitted patients.

In samples collected from vagina, cervix, uterus and site of episiotomy Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus

**Table 1 :** Mothers' age at the time of delivery & re hospitalization

Age (year)	No. of mothers at the time of delivery	s at the time of re-hospitalizationNo. of Mother
15 – 19	901	9
20 – 24	2491	26
25 – 29	1759	18
30 – 34	402	4
35 – 39	520	5
40 – 44	4	1
Total	6077	63

saprophyticus, Streptococcus pyogenes, Streptococcus agalactiae, Enterococci spp, peptostreptococci, peptococcus, and other bacteria such as Gardnerella, Chlamydia, Mycoplasma and ureaplasmas, and Klebsiella were isolated. Concomitant bacterium was mainly E.coli. Majority of bacteria isolated from the site of episiotomy, secretions and pus were the normal flora of that site. In 38% of patients anaerobes were isolated and in 50% cases both aerobes and anaerobes were found. Usually in culture examination of each sample about 5 types of bacteria were found.

The bacteria isolated from patients are summarized in table 2.

Aerobic bacteria including Staphylococcus epidermidis, S. aureus and different Streptococcal species were isolated and identified in majority of cases. Aerobic bacteria were identified on the basis of microscopic examination of stained smears, culture of samples on blood agar and differential media. Biochemical and serological assays were also used for identification. Enterococcus faecalis and other species were isolated from some samples. Usually haemolysis on blood agar and other biochemical characteristics and tests were used to identify and differentiate these bacteria.

Gardnerella vaginalis was one of the bacteria

isolated in some samples. Gram negative bacilli including Escherichia coli were also isolated from some of the samples on EMB medium and using biochemical tests.

## Discussion

Recognition of the common etiologic agents of post partum infection can lead to better management of patients. Rossignol (5) reported 21.1% morbidity after delivery while 13.6% death was due to infection. Yoko et al (6) reported that 0.6% of all deliveries lead to infection. Panchal et al (7) reported the overall delivery mortality ratio as 16.4% due to infection. Sands et al (8) found that surgical site infection in 84% cases occurred after hospital discharge. In our work, infection at the site of episiotomy reaches 50% of all infections while Soper reported infection rate of 2% at the site of episiotomy (9).

Shiliang Liu (10) in a study on 16404 cases reported that 1.8% of mothers were re hospitalized within 60 days after initial discharge. According to him 1.5% cesarean deliveries were associated with readmission. Major puerperal infection was increased among women delivered by cesarean section as compared to vaginal delivery (0.45% versus 0.27%). Yokoe et al (11) reported the overall post partum infection rate of 6.0% with rate of 7.4% following cesarean section and 5.5% following vaginal delivery.

Usually multiple species of bacteria are isolated, although they are typically considered to be relatively of low virulence. Cervix usually harbors such bacteria, while the uterus contamination with aerobic and anaerobic organisms is 63% of cultured samples, anaerobes alone grow in 50% and aerobic bacteria alone in more than 12% of cases. According to Yokoe et al (6), an average of 2.5 organisms were identified from each specimen while in our study, an average of 5 organisms were isolated from each case. Bacteria that colonize the cervix and vagina gain access to the amniotic fluid during labor and post partum, they invade devitalized uterine tissue. Bacterial colonization of the lower genital tract with certain microorganisms like group B Streptococcus, Chlamydia trachomatis, Mycoplasma hominis and Gardnerella vaginalis has been associated with an increased risk of post partum infection.

Staphylococcus aureus has been recovered from almost all of the afflicted persons and colonization of the Clostridium sordelli is described in women with

**Table 2:** Bacteria mainly isolated from different samples

Bacteria isolated	Frequency (%)
Streptococcus pyogenes	6.7
Streptococcus agalactiae	7.3
Enterococcus	11.8
Peptostreptococcus spp	12.4
Peptococcus spp	10.7
Staphylococcus aureus & S. epidermidis	7.9
Staphylococcus saprophyticus	5.8
Bacteroids spp	10.9
E.coli & other enterobacteriaceae	9.3
Clostridium	2.1
Gardnerella vaginalis	6.8
N.gonorrhoeae	0.8
Chlamydia trachomatis	2.3
Mycoplasma hominis & Ureaplasma	3.2
Streptococcus pyogenes	6.7

infection. *Gardnerella vaginalis* is also isolated more often in younger women indicating that it has pathogenic role in post partum infections (1). Predominant anaerobic bacteria are gram positive cocci (*peptostreptococcus* and *peptococcus* species) in 45%, *Bacteroids* species in 9% and *Clostridium* species in 3% of caes. Gram positive aerobic cocci are also common (*Enterococcus* 14%, group B *Streptococcus* 8%) (1). *Chlamydia trachomatis* has been implicated as a cause of late onset indolent metritis that may develop in 1/3 of women (11). Frequency of the isolated bacteria is given in Table 2. The difference in the frequency reported by others (2) is due to different criteria including prevalence of the bacteria in the area, difference in normal flora of the patient, hospital staff, hospital instruments and delivery room conditions. Serious infection is more likely in women who sustain a fourth degree laceration. Goldaber & colleagues (12) described 390 such women of whom 5.4% had morbidity, 2.8% had infection and dehiscence and 0.8% had only infection. In spite of more number of cases in the age group of 20 – 29, yet it is noticed that infection rate is higher among young mothers, may be because they are younger and un-experienced; while, older mothers having enough experience and knowledge, care more about their health. Sherman and co-workers (13) showed that bacteria isolated at cesarean delivery correlated with those taken at 3 days post partum when metritis had developed.

It may be concluded that different rates of infection reported by different researches show the effect of different related factors like individual hygiene and behavior, genetics, climatic differences and more important, presence of bacterial species and normal flora, hospital hygiene including instrument / operation theater or delivery room. The route of delivery is the most significant risk factor for the development of uterine infection (14, 15).

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