Pattern of Microbial Flora in Septic Incomplete Abortion in Port Harcourt, Nigeria.

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ABSTRACT

Background: Septic abortion occurs when there is colonization of the upper genital tract by micro organisms following termination of pregnancy usually before the age of viability. This can result from ascending infections from the lower genital tract or direct inoculation of micro organisms from contaminated and poorly sterilized instruments at the evacuation of the uterus in incomplete abortion or during unsafe abortion. Septic abortion is accompanied by significant morbidity, cost and maternal death in Nigeria. Knowledge of the microbial flora causing septic abortion is important in the prevention and treatment of this condition. The aim of this study is to identify the common micro organisms present in the endocervix and posterior vaginal fornix in patients with septic abortions.

Methods: This is a prospective study of the micro organisms present in the endocervix and posterior vaginal fornix in 150 women with septic abortion as identified in bacterial cultures between 1st January 2006 and 31st December 2008 at the Obstetrics and Gynaecology units of University of Port Harcourt Teaching Hospital and Braithwaite Memorial Specialist Hospital Port Harcourt.

Results: There were polymicrobial colonization of the upper genital tract and vagina in most cases. The commonest organisms cultured are Escherichia Coli (49.2%) and Staphylococcus Aureus(37.1%). The least commonly identified organisms were Bacteriodes(3.8%) and Clostridium species(2.3%).

Conclusion: Escherichia Coli is the commonest organism cultured in septic abortion in this environment. The infections are usually polymicrobial. They are mainly enteric organisms found in genitourinary infections.

Key words: Septic Abortions; Infection Pattern; Nigeria.

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INTRODUCTION

The infection of the female upper reproductive tract is one of the serious complications of abortion. Ascending bacteria from the vagina or perineum could infect the retained products of conception during spontaneous abortions. Also direct inoculation of the uterine cavity with micro-organisms especially at unsafe abortions could give rise to septic abortion. Septic abortion has been shown to result in 6 to 33 % of maternal deaths in different reports in Nigeria[1-7]

Port Harcourt is an urban city in Nigeria. Current Nigeria Demographic and Health Survey (NDHS)[8] estimates that 47% of the females in the reproductive age resides in the urban areas and only 10% of women in this age group are currently using modern contraceptive method. The incidence of unwanted pregnancy amongst women in Port Harcourt is therefore anticipated to be high. Induced abortions are still illegal in Nigeria and are largely procured in clandestine manner[9], in unhygienic places making it unsafe. The microbial flora commonly implicated in septic abortion, are micro-organisms that colonized the cervix and vagina prior to or during the abortive process. The micro-organisms introduced into the uterus from the use of poorly sterilized instruments, during the process of evacuating the uterus as treatment for incomplete abortion or at induced abortion, are also implicated. Common organisms that have been implicated are Escherichia Coli (E. coli), streptococci, staphylococci and rarely organisms like Clostridium Welchi, clostridium Tetani, or clostridium perferinges[10,11].

The infections caused by these organisms contribute significantly to abortion deaths and the long term morbidities such as infertility, ectopic pregnancy, pelvic abscess and peritonitis. Some of these organisms are highly virulent possessing properties that protect them from destruction by the host immunity while eliciting systemic immune response to the infection leading to septic shock in which there is a dangerous drop in the blood pressure and multiple organ dysfunction[10-12]. These organisms release endotoxins(gram ve organisms) or exotoxins (gram +ve organisms) from the site of infection or the blood in cases of bacteremia which stimulate the immune cells such as macrophages and neutrophils to release the endogenous mediators of sepsis such as the tumor necrosis factor (TNF). This triggers the cascade of events which is originally created to protect the body against the invading microorganisms, but ultimately turns against the individual to cause multiple organ and system dysfunction[12]. The mortality rate in septic shock is very high as up 40% of patients will die[6]. The virulence of some of the microorganisms is enhanced by encapsulation and spores production which enables them evades detection by body defense mechanism[12]. To improve antibiotic effectiveness within the intrauterine environment (prophylaxis or treatment) any retained product must be evacuated. This process of evacuation can itself lead to the infection of the intrauterine cavity if done in an environment not meeting minimum hygiene standard.

The process of microbiological culture and sensitivity in a low resources setting is not only expensive for the average Nigerian but will take at least 48 hours to complete. Also

majority of the patients present late with advanced infectious morbidity[10] and may not be alive in the next 48 hours to benefit from the culture and sensitivity result. In such situations the knowledge of microbiological flora involved in septic abortion will guide the choice of antibiotics treatment. This knowledge will also guide the antibiotics prophylaxis during or after uterine evacuations for incomplete abortions thereby preventing septic abortions.

PATIENTS AND METHODS

This is a prospective study carried out between January 2006 and December 2007 in the University of Port Harcourt Teaching Hospital and Braithwaite Memorial Hospital. These are both major hospitals offering tertiary care in Port Harcourt the capital city of Rivers State. Ethical approval for this study was given by the UPTH ethics committee. The sample size was determined using the Kish formula at 95% confidence interval, prevalence rate of 10% and sampling error of 2.5%. The calculated minimum sample size was 124. The average combined number of septic abortion in both hospitals was about 48 per year. A period of three years was used to capture our sample size of 150. All the women who were admitted for incomplete or incomplete septic abortion were included in the study. The patients gave informed consent after counseling prior to collection of the sample. A total of 2584 gynaecological admissions occurred in these hospitals during this period. 282 patients were admitted for complications of abortion and 150 patients who had the clinical or ultrasound diagnosis of incomplete abortion, septic abortion or incomplete septic abortion were studied. The social and demographic characteristics of these patients were extracted from the patients at time of inclusion into study. Using aseptic techniques, a sterile Cuscus speculum was passed into the vagina to expose the cervix and samples were collected from the cervical canal and the posterior fornix of the vagina. Samples were collected with sterile cotton tipped swabs on wooden applicator sticks encased in plastic tubes. The swabs were immediately placed in Bijou bottles containing Stuarts transport media freshly built to expel air. Each swab stick was broken at the middle and the bottles screwed with the cover. The specimens were returned to the microbiology laboratory of UPTH. Each specimen was inoculated on to sterile plates of blood agar, chocolate agar and MacConkey (Bile salt) agar.

The plates were incubated aerobically, anaerobically and microaerophilically in a gas-pack jar at 37°C for 48hours. The anaerobic plates with no growth after the initial 48hours incubation were re-incubated for another 24hours. At the end of incubation, the cultures were read and appropriate colonies subcultured for purity.

The routine laboratory methods involving microscopy, biochemical and physiological tests were used to identify the different organisms. A case is regarded as positive when at least a swab from either site identified an organism. The data collected on an excel spreadsheet for analysis. The result presented in percentages and frequency tables.

RESULTS

Samples from 132 patients out of the 150 included in the study grew organisms while the samples from 18 patients had no growth. The incidence of abortion related complications was 11% and septic abortion was 5.1% of all gynaecological admissions in these two hospitals. Septic abortion occurred more in single women with poor education aged 15-25 years and least in those aged 36years or more, who were married and with at least secondary education (Tables 1, 2, 3).

Although the infections were polymicrobial, Escherichia coli was the commonest micro organism cultured. It was present in 49.2% of the cases. The least common organism was clostridium species which occurred in 2.3% of the cases. Other micro-organisms cultured were Staphylococcus Aureus in 37.1% of cases, Candida Albicans in 21.2%, Klebsiella species in 11.40%, Group B Streptococcus in 6.1%, Neisseria Gonococcus 5.3%, Peptostreptococcus and Bacteriodes were 3.8% each in the studied population. Nine different organisms were isolated from the posterior fornix of the vagina in these patients while seven of these same organisms were isolated from the endocervix. The Neisseria Gonococcus infections were readily isolated from endocervical samples when present. All the other organisms found in the vagina were present in the endocervix except the

Table 1: Demographic Characteristics Of Patients

AGE (YEARS)	NO.	%
16-20	36	27.3
21-25	64	48.9
26-30	15	14.4
31-35	12	9.1
36-40	5	3.4
TOTAL	132	100
MARITAL STATUS	NO.	%
NOT MARRIED	105	79.5
MARRIED	27	20.5
TOTAL	132	100
LEVEL OF EDUCATION	NO.	%
PRIMARY	83	62.5
SECONDARY	42	31.8
POST SECONDARY	7	5.7
TOTAL	132	100

Table 2: Micro-organism Isolated

MICRO-ORGANISMS	NO OF POSITIVE CASES	%
Escherichia Coli	65	49.2
Staphylococcus Aureus	49	37.1
Candida Albicans	28	21.2
Klebsiella Species	15	11.4
Group B Streptococcus	8	6.1
Neisseria Gonococcus	7	5.3
Peptostreptococcus	5	3.8
Bacteriodes	5	3.8
Clostridium Species	3	2.3

Table 3: Organisms Found in Endocervical and High Swabs

MICRO-ORGANISMS	ENDOCERVICAL SWAB	HIGH VAGINAL SWAB
Escherichia Coli	++	+++
Staphylococcus Aureus	-	+++
Candida Albicans	-	+++
Klebsiella species	++	++
Group B streptococcus	++	++
Neisseria Gonococcus	+++	+
Peptostreptococcus	++	++
Bacteriodes	++	++
Clostridium species	++	++
Total isolates	7	9

KEYS
- \- No positive sample found at site
- \+ <20% of positive samples from this site
- ++ > 20% but =50% of positive samples from this site
- +++ >50% of positive sample from this site

Staphylococcus Aureus and Candida Albicans (table 4,5). Staphylococcus Aureus and Candida Albicans occurred almost in the same proportions in both sites when they are present.

DISCUSSION

It is obvious from literature that septic abortion is one of the many causes of admission and maternal death in the gynaecology wards in Nigeria and this has generated lots of studies estimating the incidence of septic abortion to be as much as 33% in some centres causing about 2.5-8.5% of maternal deaths in Nigeria and up to 33% of abortion related maternal deaths[3-7,13]. Over 75% of those with septic abortion in this study were aged 25years or less. This is in keeping with other studies[12,13] where induced abortion and septic abortion occurred more in these group of people. The low incidence of septic abortion noted here as compared to other studies may be as a result of the existence of many private specialist clinics in Port Harcourt were patients may seek treatment. Two gram negative enteric organisms, E. coli and klebsiella were isolated in over 60% of the infected samples. The proximity of the gut to the female genital tract and poor perineal hygiene could be responsible for this. These organisms have also been generally reported to be the common orgnanisms implicated in septic abortion[9,10]. These organisms are very virulent. They release endotoxins and easily predispose to septic shock and maternal death. Chlamydia Trachomatis which is the most common organism involved in sexually transmissible infections in women[7] was not detected in this study because tissue culture and the serological tests for the detection of this organism were not available in these hospitals as at the time of the study. All organisms detected in the intracervical swab were also detected with the high vaginal swab except that Neisseria gonococcus was more readily identified with the intracervical swab. The Neisseria gonococci organism are gram negative diplococci which can result in pelvic inflammatory disease and its long term complications of infertility, ectopic pregnancy, pelvic abscess and peritonitis. Rarely, it can lead to gonococcal bacteremia. Staphylococcus aureus and Candida Albican may just be organisms causing local vaginal infection as they did not occur in the endocervix and may not have been responsible for the ascending upper genital tract infection in septic abortions. However, Staphylococcus aureus is one of the several organisms that have been reported to cause septic abortion[9,10]. Clostridium is a spore forming gram positive rod and bacteriodes a gram negative rod both of which are obligate anaerobes. They thrive well in oxygen deficient environment such as retained products of conception. The clostridium is responsible for tetanus, gas gangrene, psuedomembranous colitis. They are harmful to the human host by secreting an extremely powerful exotoxin and enzymes which are involved in causing these diseases. Bacteriodes may be home to the vagina but may cause abscess in septic abortion, pelvic inflammatory disease or tubo-ovarian abscess[11].

Peptostreptococcus specie are also gram positive anaerobes which are normal flora in the mouth, vagina, and intestines. They are involved in the formation of abscess and septiceamia as well as infecting retained products of conception when present in incomplete abortion.

The group B streptococcus are gram positive beta haemolytic organism and are normal vaginal flora in up to 25% of women. Again they may become virulent when found elsewhere such as the endometrium, as in incomplete abortion.

Since most patients with septic abortion have polymicrobial infection with over 50% of them having E.coli or klebsiell or both of these organisms, initial treatment should include more than one broad spectrum antibiotics, while a culture and sensitivity of the patient's intracervical swab is being carried out to determine the offending micro-organisms. We also recommend a further study to determine the antibiotic sensitivity to these organisms.

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