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THE ROLE OF GENITAL CHLAMYDIAL INFECTION IN ACUTE PELVIC INFLAMMATORY DISEASE.

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ABSTRACT

The polymicrobial nature of pelvic inflammatory disease (PID) underscores the need for a clearer understanding of the pathogenesis and etiology of PID especially among core groups most at risk. This study was designed to determine the role of specific microbial infections in leading to PID among women. Prevalence of genital chlamydial infection and other reproductive tract infections were determined in 100 women presenting at a health facility at Port Harcourt, Rivers State, Nigeria. The result showed that 11.1 per cent of women with acute PID were infected with *Chlamydia trachomatis* as compared to 4.3 per cent in the control group (odds ratio 2.75: 95% confidence interval (CI), 0.7-11.7). *Neiserria gonorrhoeae* was not detected in either of the two groups. Trichomoniasis (10% in PID cases and no case in control group) and bacterial vaginosis (17.5% and 4.3% in PID and control group respectively: Odds ratio 4.7, 95% CI, 1.0-21.1) were also significantly associated with the clinical picture suggestive of acute PID. It is recommended that where resources are limited, patients presenting with acute PID be treated empirically for *Chlamydia trachomatis,* trichomoniasis, bacterial vaginosis and gonorrhoea.
Key Words: Pelvic inflammatory disease, *Chlamydia trachomatis*, Neiserria gonorrhoeae, Bacteria vaginosis, Trichomoniasis,

INTRODUCTION

Appreciating the etiologic relationship between sexually transmitted disease (STD), pelvic inflammatory disease and infertility is a complex exercise which involves looking at the correlation among varying conditions with varying definitions (1). The term pelvic inflammatory disease has come to represent clinically suspected endometritis and or salpingitis that have not been objectively confirmed pathologically. Thus, the diagnosis of PID is often made in sexually active women based on complaint of lower abdominal pain in addition to abnormal vaginal discharge, cervical uterine and adnexal tenderness.

Several investigations have emphasized the polymicrobial nature of pelvic inflammatory disease (2, 3, 4, 5, 6). In general, three major groups of microorganisms are recognized as

playing an etiologic role in PID which includes *N. gonorrhoeae, C. trachomatis* and a wide variety of anaerobes and aerobic bacteria. *C. trachomatis* and *N. gonorrhoeae* are associated with the initiation of tubal infection while the anaerobic and aerobic bacteria that constitute the normal vaginal flora are involved as secondary invaders in an infected female. The rates at which Chlamydia, *N. gonorrhoeae* and other organisms have been found in patients with symptomatic PID differ widely (5, 7). For example recovery rate of Chlamydia organisms varied from 25% to 50 % in

symptomatic PID patients in industrialized nations (7). However, there is paucity of data in developing countries. There is therefore an urgent need for prevalence studies of Chlamydia and other reproductive tract infections among groups most at risk of PID especially in resource poor settings. A clearer understanding of the etiology of PID and confirmation of the role of specific vaginal infections in leading to PID might reduce the need for invasive diagnostic procedures and permit a more rational basis for selecting antimicrobial therapy in the individual patient.

This study therefore gives preliminary information on microbiological indicators in patients with lower abdominal pain satisfying the diagnostic criteria for PID as outlined in the methodology compared to a control group of patients without symptoms suggestive of PID.

Materials and Method

As part of an on-going study on reproductive health of women in Rivers State which started in 1997, a total of 100 women referred to the clinic were recruited into the study after their consent was obtained. For the purpose of this study, a probable case of PID was defined as a patient presenting with lower abdominal pain and self reported copious foul smelling vaginal discharge only, (this was included to assess the validity of treating such patients syndromically for PID) and a case definition of PID was taken as a patient presenting with self reported abnormal vaginal discharge, lower abdominal pain and adnexal tenderness. A control case was defined as a woman referred for counseling for family planning purpose with no clinical evidence of lower abdominal pain or abnormal vaginal discharge. Questionnaires with basic demographic data and gynecological history were compiled. Gynecological examination was done.

Laboratory investigations: High vaginal swabs were taken. Wet mount microscopy was done to identify *T. vaginalis*, clue cells and yeast cells. Bacterial vaginosis was further identified by presence of clue cells in Gram stained smear (8). Two endocervical swabs were taken from each patient. One was inoculated in Thayer Martins selective medium for isolation of *N. gonorrhoeae* and incubated under anaerobic conditions for 48 hours. Each batch of plate was quality controlled with *N. gonorrhoeae* standard strain ATCC 49226. The second cervical swab for Chlamydia antigen was processed within a week of collection using an Enzyme Linked Immunosorbant Assay (ELISA) (MASTAZYME; Mast laboratory, Bootle UK). All ELISA positive and borderline specimens were confirmed by direct immunofluorescence assay (MICROTRAT; SYVA, Berkshire UK). Briefly, test specimens were vortexed and centrifuged at 13000rpm for 30 minutes. Pellets obtained as residue were stained on immunofluorescence slide according to procedure outlined on the kit and then observed under immunofluorescence microscope. Slide with elementary bodies appearing as individual pinpoints of medium to bright apple green fluorescence was considered positive for Chlamydia. A positive control was included in each run.

Result

Of the 100 women initially followed up 40 patients were classified as probable cases of PID and 27 as PID cases. The data for the rest was considered incomplete and therefore not analyzed. The age range was 15-42 years with a mean age of 26 years (SD $\pm$ 5.8). The prevalence rate of vaginal infection in the study population is as indicated in table 1 while table 2 and 3 highlights the prevalence of

reproductive tract infections in women with lower abdominal pain and those who met the criteria of PID as defined in the study respectively.

vaginosis as defined by gram-stained smear (presence of clue cells - curved gram variable cocco-bacilli surrounding epithelial cells, absence of pus cells) gave a prevalence rate of 13.8% in the overall study population and 25.9 per cent when considering only those with PID.

The prevalence rate of Chlamydia was 6.9% in the study population. The rate increased to 12.5% when considering women presenting with abnormal vaginal discharge and lower abdominal pain. While it was 11.1% in the PID study group. Prevalence rate of *T. vaginalis* was 4.6 per cent in the overall study population. The rate increased to 10.0% in patients presenting with lower abdominal pain and abnormal vaginal discharge and 14.8% when adnexal tenderness was added to the two cardinal symptoms. There was little difference in the prevalence rate of yeast infection, 51.7%, 47.8%, and 47.8% in the overall study population, PID cases and control cases respectively.

There was a case of mixed sexually transmitted infection with Chlamydia and *T. vaginalis*. Also *Neisseria gonorrhoeae* was not isolated during the study period.

Endocervical polymorph nuclear cell (PMN) counts were not predictive of acute PID or Chlamydia infections. 24.3% of patients with PID had PMN counts greater than 10 per oil immersion field as compared to 27% in the control cases. However, in

TABLE 1: Overall distribution of reproductive tract infection in the study population

Organisms	Prevalence rates (%)
Chlamydia trachomatis	**6.9**
Neisseria gonorrhoeae	**0**
Trichomonas vaginalis	**4.6**
Yeast cells	**51.7**
Bacterial	

the patients with acute PID, 66.7% of the chlamydial infection was described clinically as presenting with mucopurulent vaginal discharge.

TABLE 2: Prevalence of reproductive tract infections among patients presenting with lower abdominal pain, and abnormal vaginal discharge

	*Probable PID cases (n=40)	Control cases (n=23)
Chlamydia trachomatis	12.5	4.3 (Odds ratio 3.1, 95% CI, 0.9-10.8)
Neisseria gonorrhoeae	0	0
Trichomonas vaginalis	10.0	0
Yeast cells	55.0	47.8
Bacterial vaginosis	17.5	4.3 (Odds ratio 4.7, 95% CI, 1.0-21.1)

TABLE 3: Prevalence of reproductive tract infections among patients presenting with all 3 criteria (lower abdominal pain, abnormal vaginal discharge and adnexal tenderness).

	*PID cases (n=27)	Control cases (n=23)
Chlamydia trachomatis	11.1	4.3 (Odds ratio 2.75, 95% CI, 0.7-11.1)
Neisseria gonorrhoeae	0	0
Trichomonas vaginalis	14.8	0
Yeast cells	51.9	47.8
Bacterial vaginosis	25.9	4.3 (Odds ratio 7.7, 95% CI, 2.3-24.3)

Discussion

This study alerts us to the fact that Chlamydia may be an important etiologic agent in the development of acute PID in Port Harcourt. The prevalence of genital chlamydial infection in the overall study group was 6.9 %. The percentage increased to 11.1% in the PID case compared to 4.3% in the clients without PID, (odds ratio 2.75, 95%, CI 0.7-11.7).

Trichomoniasis and gram stained smear appreciation of curved gram variable coccobacilli and clue cells typical of bacterial vaginosis have been strongly associated with acute PID compared with the control group. Few studies in Nigeria have been carried out with the aim of attempting an etiologic base for acute PID. No published article was available on prevalence of chlamydia in acute PID in Port Harcourt. Therefore, it is clear that a more comprehensive well designed study is needed to better appreciate the association highlighted in this preliminary study.

Patients with *C. trachomatis* infection were significantly younger and were more often unmarried compared to patients without *C. trachomatis* infection. These findings are comparable to other studies (7, 9). The addition of adnexal tenderness to our definition did not significantly alter the prevalence of Chlamydia. This would be most interesting if confirmed by a more elaborate study. The entry point in the syndromic algorithm for PID management in the National Manual on Syndromic Management of STD is lower abdominal pain complemented by abnormal vaginal discharge. If Chlamydia

recovery is not enhanced by addition of the third criteria of adnexal tenderness as this study suggests, it would be useful information in evaluating management of PID in this setting.

T. vaginalis is not usually described as a pathogen of the cervix. However, studies are beginning to associate the organism to cervical infection (10) and recently with PID in women infected with HIV (10, 11). In most cases, PID is associated with *N. gonorrhoeae* or *Chlamydia trachomatis* (10). Our study showed a case of one mixed infection of *T. vaginalis* and *C. trachomatis*. *Trichomonas vaginalis* recovery is strongly associated with acute PID in this study, even more so when adnexal tenderness was added to the lower abdominal pain and abnormal vaginal discharge; 10.0 per cent and 14.5 per cent respectively compared to the control cases where the organism was not isolated. This result tends to suggest that some of the PID cases may in fact be trichomoniasis. This finding has also been observed in South Africa (10).

The absence of gonococcal infection may be explained by self- prescription of antibiotics amongst the study population. Self medication may not affect Chlamydia infection since the drug need to be taken for a longer period and compliance is not likely to be good enough to complete the dosage.

Bacterial vaginosis has been associated with acute PID, though in a rather undefined manner. This study shows a pronounced association between the gram appearance typical of bacterial vaginosis and acute PID compared to the control. The picture of the clue cells defined as curved gram variable coccobacilli distorting the epithelial cell lining and lack of gram positive bacilli is indicative of bacterial vaginosis. (9) Studies linking this picture with anaerobic mobiluncus culture confirm that while the "whiff test" would indeed be complementary to the microbiologic picture, the gram stained smear is sensitive and specific enough to suggest bacterial vaginosis. It is argued that primary cervical pathogen such as Chlamydia may in effect alter the vagino-cervical micro-environment leading to an alteration of the flora and presenting as bacterial vaginosis (1, 12).

In conclusion genital Chlamydial infection is shown to be associated with the clinical picture typical of pelvic inflammatory disease. Trichomoniasis and bacterial vaginosis were also associated with this condition when compared to the control group.

In resource poor setting where one is not likely to have access to laparoscopy to make a diagnosis of acute salpingitis or the facility to culture Chlamydia, it is recommended that empirical treatment for acute PID should include treatment for chlamydial infection, bacterial vaginosis and trichomoniasis. Other studies have outlined the importance of also treating for *N. gonorrhoeae*. These preliminary findings have shown the importance of designing a comprehensive study to better appreciate the polymicrobial etiology of acute pelvic inflammatory disease.

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