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Pelvic inflammatory disease in adolescents between the time of testing and treatment and after treatment for gonorrhoeal and chlamydial infection

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Summary: In incarcerated adolescents, 13% developed pelvic inflammatory disease (PID) between the time of testing and treatment for chlamydial and gonorrhoeal infection, and 13% developed PID in the 30 days following single-dose treatment for one or both of these infections.

Keywords: women, adolescence, sexually transmitted infection, pelvic inflammatory disease, PID, chlamydia, gonorrhoea, treatment

INTRODUCTION

During our care of incarcerated female adolescents, we had the impression that some patients developed pelvic inflammatory disease (PID) between the time of testing and treatment for chlamydial and/or gonococcal infection, and that some patients who had no evidence of PID at the time of single-dose antibiotic therapy for infection developed PID subsequent to this treatment. We decided to evaluate this impression by conducting a prospective study.

In previous research, Hook *et al.*¹ reported that three of 96 women (3%) developed PID between the time that they were tested and treated for chlamydial infection; the median interval between testing and treatment was 14 days. Geisler *et al.*² determined that two of 115 (2%) women developed PID during intervals between testing and treatment for chlamydial infection of seven and 25 days. We were not able to find any studies that gave specific information about the occurrence of PID in the first month following treatment for gonorrhoeal and/or chlamydial infection.

The purpose of this prospective cohort study was to determine the incidence of PID between the time that we tested incarcerated adolescents for chlamydial and gonorrhoeal infection and the time that we received positive results and re-evaluated and treated these patients. We also evaluated the incidence of PID during the month following treatment of those patients who had no evidence of PID at the time of treatment for their positive tests for chlamydia and/or gonorrhoea.

METHODS

We performed the study at the Harris County Juvenile Detention Center (Houston), TX, USA. At the time of their

mandated medical assessment, which took place within seven days of admission, all incarcerated adolescents submitted first-catch urine samples for chlamydia and gonorrhoea testing. We used the Gen-Probe Aptima Combo 2 assay (Gen-Probe Inc, San Diego, CA, USA). The tests were run in batches by the Houston City Health Department, so that a variable length of time elapsed between the day of testing and the day that we received test results. If at the time of testing a patient had symptoms suggestive of PID, we performed a bimanual pelvic examination and treated those who met the criteria for PID. We did not perform examinations of asymptomatic women. For the diagnosis of PID, we used the criteria of the US Centers for Disease Control and Prevention (CDC): the presence of adnexal or cervical motion or uterine tenderness.³ The pelvic examinations were performed by one of three experienced physicians. If patients had PID at the time of testing, they were excluded from the study.

For the patients who did not have PID at the time of testing, we re-assessed them on the day that we learned that their urine test was positive. At re-assessment, patients received a PID diagnosis if they met the PID diagnostic criteria on bimanual pelvic examination. We examined patients who complained of lower abdominal pain; we did not examine asymptomatic patients. We treated infected patients with no evidence of PID for chlamydial and gonococcal infection with 1 g of azithromycin and 400 mg of cefixime orally, even if they were positive for only one of the two organisms. We treated for both organisms in case one test was false negative. Treatment was observed by clinic staff; if the medicine was vomited, treatment was repeated following the administration of an antiemetic.

We followed all treated women for 30 days or until released, to determine if they developed PID after treatment for gonorrhoeal and/or chlamydial infection.

During incarceration, these patients had limited opportunity for sexual activity with other youth or adults. They did not share rooms with other detainees, and the juvenile supervision

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officers who oversaw the detention areas were not allowed in the detainees' rooms unless a second officer stood at the door. The male and female youth were strictly segregated.

This study was approved by the administration of the Harris County Juvenile Probation Department and by the Committee for the Protection of Human Subjects of the University of Texas Health Sciences Center at Houston.

RESULTS

Between 29 March and 27 October 2010, we evaluated 99 subjects who had positive tests for chlamydia, gonorrhoea or both. Their mean age was 15.8 years (standard deviation [SD] 1.1). Their race/ethnicity distribution was 43% black, 32% Hispanic and 25% white; 74% had chlamydia, 14% gonorrhoea and 12% both.

For all patients, the interval between testing and treatment ranged from two of 17 days; the mean (SD) was 7.5 (2.9) days. During this interval, 13 of 99 (13%) developed lower abdominal pain and had bimanual pelvic examination findings that met the CDC's diagnostic criteria for PID.³ Of these 13, 10 (77%) had chlamydia, two (15%) had gonorrhoea and one (8%) had both infections, so that the distribution of the type of infection was similar to that in the group as a whole. Time from initial urine testing to treatment for PID ranged from seven to 15 days.

Of the 86 patients who had positive tests for chlamydia, gonorrhoea or both, and who had no evidence of PID at the time of treatment, we were able to follow 62 subsequent to their therapy for infection. Their mean age was 15.6 (SD 1.2) years; 45% were black, 31% Hispanic and 24% white; 73% had chlamydia, 18% had gonorrhoea and 8% had both infections. Duration of follow-up after treatment ranged from six to 30 days. During follow-up, eight of 62 (13%) developed lower abdominal pain and had bimanual pelvic examination findings that met the CDC's diagnostic criteria for PID.³ Of these eight, six (75%) had chlamydial and two (25%) had both infections, so that the proportion of patients who had only chlamydial and who had gonorrhoeal infections was similar to that in the group as a whole, although the few patients who had gonorrhoeal infections had a chlamydial infection as well. All but one patient developed PID at least 10 days after oral single-dose therapy (range 3–30 days).

DISCUSSION

It is of concern that 13% of these adolescents developed PID between the time of testing and treatment for gonorrhoea and chlamydia infection, and that an additional 13% developed PID in the month following single-dose therapy for these organisms. We have no explanation of why these risks are similar; the similarity may be coincidental.

The investigators in the two articles discussed in the Introduction section^{1,2} also found that some women developed PID between testing and treatment for chlamydial infection, although less frequently than in our study. We were unable to find studies that reported on the occurrence of PID in the 30 days following single-dose therapy for chlamydial and/or gonorrhoeal infection. The latter cases may have resulted from treatment failures. Such failures have been reported for azithromycin therapy of chlamydia,⁴ and evidence is emerging that some strains of gonorrhoea are resistant to oral

cephalosporins.⁵ Except in pregnant women, tests of cure for gonorrhoeal and chlamydial infection treated with single-dose cefixime and azithromycin are not currently recommended by the CDC but may be so in the future. Some cases of PID may have been caused by other organisms, for example, those responsible for causing bacterial vaginosis, which are not treated effectively by the single-dose antibiotic therapy used to treat gonorrhoea and chlamydia.

Important strengths of this study were our ability to follow prospectively a cohort of women that remained relatively intact and whose members had limited opportunity for sex during the follow-up period. A limitation is the known inaccuracy of the clinical diagnosis of PID; experts have estimated that 65–90% of patients who meet the CDC criteria actually have PID.³ Although we asked patients if the pain they described was similar to that during previous bimanual examinations or if the discomfort was pain or pressure, over-diagnosis may have led to an overestimate of the incidence of PID in the two parts of our study. These false-positive cases may have been at least partially offset by missed diagnoses in subjects who denied symptoms or signs of PID or who had such mild disease that symptoms were minimal or lacking (so-called 'silent' PID).³

In conclusion, we found in a prospective cohort study of incarcerated adolescents that 13 of 99 (13%) developed PID during the interval between testing and treatment for gonorrhoea and chlamydia, and that eight of 62 (13%) developed PID in the month after being treated with single-dose therapy for these organisms. Patients who were infected with chlamydia had approximately the same risk of PID as did those infected with gonorrhoea. These results suggest that the interval between testing and treatment for chlamydia and gonorrhoea should be kept as short as possible, and that clinicians should be aware of the possible occurrence of PID both during this interval and also soon after single-dose therapy. The incidence of PID may have been greater following therapy if we had not treated for both infections even if the patient had a positive test for only one. Perhaps tests of cure following currently recommended single-dose therapy for gonorrhoeal and chlamydial infection would prevent some cases of subsequent PID. Tests of cure are not recommended sooner than three weeks after the completion of therapy, and therefore only cases of PID that occur more than three weeks after treatment failures might be prevented.

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