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Pelvic Inflammatory Disease in a Pediatric Emergency

Department: Epidemiology and Treatment

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Abstract

Objectives—The majority of adolescent cases of pelvic inflammatory disease (PID) are diagnosed in the emergency department (ED). An important step to prevent PID-related morbidity among this high-risk population is to quantify prevalence, microbial patterns, and identify testing and treatment gaps.

Methods—We performed a retrospective, cross-sectional study of all visits by adolescents to an urban children's ED with an ICD-9 diagnosis of PID in 2012. We used standard descriptive statistics to quantify PID diagnoses, sexually transmitted infections (STI) testing, and treatment.

Results—PID was diagnosed in over 9% of females with a chief complaint of abdominal/pelvic. The majority of diagnosed cases underwent some STI testing, and 40% tested positive. 70% of cases received CDC recommended antibiotics.

Conclusions—There is a high prevalence of PID among adolescents in the pediatric ED. Rates of STI testing and appropriate treatment reveal gaps in diagnosis and management, representing a lost opportunity for identification and treatment of PID/STIs among high risk adolescents.

Introduction

Pelvic inflammatory disease (PID) is the most significant complication from untreated sexually transmitted infections (STIs) with approximately 200,000 adolescents diagnosed annually in the US.(1) Over 70% of PID diagnoses among adolescents are made in emergency departments (EDs).(2) Despite expanded CDC diagnostic criteria in 2002, rates of PID diagnoses have remained unchanged, raising concern for persistent under-diagnosis. (3) In addition to under-diagnosis, several studies have demonstrated inadequate treatment in the ED setting.(3,4) Given sexually active adolescents are at the highest risk for developing PID and subsequent sequelae, quantifying prevalence and microbial and treatment patterns in the pediatric ED setting is an important step to address diagnostic and treatment gaps. (5)

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Here we describe the epidemiology and treatment of PID among female adolescents seeking care at an urban academic pediatric ED.

Materials and Methods

Study Design

This was a retrospective, cross-sectional study of all ED visits by females aged 13 through 19 years at a tertiary care pediatric hospital with an ICD-9 diagnosis of PID (614.0, 614.2, 614.3, 614.9) from January 1, 2012 through December 31, 2012. The study was approved by our hospital's institutional review board.

The study sample included visit data from two urban pediatric EDs (annual visit volume of 110,000), one located within the main campus of the pediatric hospital and a satellite ED. Visits were excluded from analysis if patients left prior to evaluation by a treating physician or if they presented to the ED for evaluation post sexual assault.

Data Abstraction

Data were abstracted from the electronic health record and stored in a database using the Research Electronic Data Capture (REDCap) tool. Abstracted data included patient demographics; ICD-9 codes; performance and results of STI testing (including *Neisseria gonorrhoeae* [GC], *Chlamydia trachomatis* [CT], and *Trichomonas vaginalis* [TV]); visit disposition; and prescribed treatment for PID.

Statistical Analysis

We calculated the prevalence of PID diagnosis among patients presenting with potential STI-related symptoms (e.g. dysuria, abdominal or pelvic pain, vaginal discharge, vaginal bleeding). Infection rates of GC, CT, and/or TV were calculated as well as ED disposition rates. Finally, we measured the percent of PID cases that were treated according to CDC recommendations. Data were analyzed using Stata 12.0 (Stata Corp, College Station, TX) for calculations of standard descriptive statistics.

Results

Of 10,324 ED visits by adolescent females over a 1-year period, 148 (1.4%; 95% CI 1.2, 1.7) were diagnosed with PID (mean age 16.9 years $\pm$ SD 1.6). The majority was of Non-Hispanic Black race/ethnicity and publically insured (Table 1). Among the 1,317 (12.8%) females presenting with potential STI-related complaints, PID prevalence was 8.9% (95% CI 7.4, 10.4). PID was diagnosed in 9.2% (95% CI 7.2, 11.1) of females with a chief complaint of abdominal and/or pelvic pain.

One hundred twenty nine (87.2%) of the diagnosed PID cases underwent STI testing. Of these, 56 (43.4%, 95% CI 34.7, 52.1) had a positive STI test for GC, CT and/or TV (7 were infected with GC only, 28 with CT only, 6 with TV only, 11 co-infected with GC and CT, 3 with CT and TV and 1 with all three infections) (Figure 1). Few patients diagnosed with PID underwent testing for syphilis (5.4%, 95% CI 1.5, 9.3) and of those who underwent testing,

none were positive. Approximately half of patients diagnosed with PID underwent HIV screening (41.9%; 95% CI 33.8, 49.9).

The majority of PID diagnosed cases were discharged home after ED treatment. Twenty-five (16.9%; 95% CI 10.8, 23.0) patients with PID were admitted to the hospital.

With regards to treatment, 70.3% (95% CI 62.8, 77.7) of PID cases were treated with appropriate antibiotics as recommended by the CDC. Of the 44 inappropriately treated cases, 31 (70.5%) were treated with ceftriaxone and azithromycin.

Discussion

Among all visits made to a pediatric ED by adolescent females over a 1 year period, PID diagnoses comprised approximately 1.5% of all visits and 9% of visits with potential STI-related chief complaints. The majority of patients underwent STI testing and overall prevalence of a positive test was high, with previous studies documenting between 12–17% STI positivity among PID-diagnosed patients.(6, 7) Higher STI positivity may reflect an increase in testing, diagnostic sensitivity, and/or higher GC, CT, TV prevalence among our population. It is concerning that over 10% of patients diagnosed with PID did not receive STI testing and only half were screened for HIV. Although we found higher rates of PID treatment compliant with CDC recommendations than other studies (8,9), almost 30% of patients received inappropriate treatment; the majority of whom were treated for cervicitis.

Chlamydia represents the most common pathogen associated with PID, either alone or as a co-infection. However, in more than half of PID cases no organism was identified. This may in part be due to testing limitations as current standards can only identify lower reproductive tract infections and evaluate for select microbes (GC, CT, and TV). Recent studies report the detection of additional pathogenic causes of PID, including *Mycoplasma genitalium* and bacteria associated with bacterial vaginosis (6,7). These findings raise important questions regarding current diagnostic limitations and the potential necessity of empirically treating for these pathogens at time of PID diagnosis.

PID is the most common diagnosis among the 170,000 US adolescents seeking treatment for STIs in the ED.(10) Our findings reveal high rates of STI positive PID in those tested, missed testing opportunities for HIV and syphilis, and incorrect treatment of PID. Given the morbidity associated with inadequate treatment, including chronic abdominal pain, infertility, and recurrent PID, (8) our study illustrates a need for provider education in-order to address STI diagnosis (including HIV) and inadequate treatment. Additionally, further studies are needed to delineate the prevalence of currently untested for pathogens and the scenarios in which testing and/or empiric treatment is prudent.

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Figure 1.
STI Prevalence in PID
No legend necessary, figure is self-explanatory.

Table 1

Demographics of Study Population

Demographic		% (95% CI)
Mean Age, years		16.9 (16.6, 17.1)
Race/Ethnicity	Non-Hispanic White	0
	Non-Hispanic Black	89.9 (84.9, 94.8)
	Hispanic	8.8 (4.2, 13.4)
	Non-Hispanic Other	1.3 (0.5, 3.2)
Insurance status	Private	14.2 (8.5, 19.9)
	Public	81.8 (75.5, 88.1)
	Uninsured	4.0 (0.8, 7.3)