

Pyuria & Positive Urine Cultures In the Setting of Sexually Transmitted Diseases

Crystalle Evans DO PGY IV, Chelsea Risinger DO PGY IV

Chelsey Gilbertson DO Adj. Assistant Professor, Stacia Shipman DO Adj. Assistant Professor

Integris Southwest Medical Center, Emergency Medicine Residency Program; Oklahoma City, Oklahoma



INTRODUCTION

Patients diagnosed with sexually transmitted infections (STIs) are common in the emergency department (ED) setting. These patients will often have had comprehensive evaluation that includes gonococcal and chlamydia testing, wet prep, urinalysis, and urine culture. The clinical presentations for sexually transmitted infections and urinary tract infections (UTIs) may overlap (1). Confirmatory urine culture results are not readily available for several days after the patient's ED visit; thus, emergency clinicians may make decisions to empirically treat for UTIs in STI-suspected and STI-positive patients based on pyuria in the initial urinalysis (UA) results alone. This study is performed to determine the frequency of sterile pyuria in patients with STIs seen in the ED. Additionally, correlations are examined between standard pelvic laboratory tests and specific STIs.

METHODS

This is a retrospective chart review of all non-pregnant female patients seen in the study ED over a three-year time period who had pelvic examinations performed with urinalysis, urine cultures, wet prep, and gonococcal and chlamydia studies. The study setting is a large metropolitan Emergency Department with over 85,000 patient visits annual volume and an associated Emergency Medicine Residency Program. Exemption from informed consent was obtained through the institution's central Institutional Review Board. All females in the study institution's medical record database ages 18 to 50 who were evaluated in the ED for STI with full laboratory data sets (gonorrhea/chlamydia DNA PCR testing, urinalysis with cultures, wet prep) were included in the study. Pyuria is defined as a white cell count of > 5 on urinalysis. The prevalence of STI and pyuria in the study population is defined and the incidence of sterile pyuria in each specific STI over the study period is determined. Data are entered sans patient identifiers into a custom database constructed in Microsoft Excel (version 14.0.7140.5002. ©Microsoft Corp. 2010) and analysis is performed with the statistical add on package Analyze-it version 2.26 Excel 12+. The Fisher Exact test for two categorical variables is used for comparisons. Results are reported as probability and odds ratio with 95% confidence intervals.

RESULTS

There are 619 cases entered into the database. The mean age is 23.25 years with a range of 14 to 50 years (median 22, mode 19). All patients had full data sets with the following prevalence of STIs in the data set as follows: gonorrhea 203/619 (32.79%) chlamydia 511/619 (82.25%), and vaginal trichomoniasis 114/619 (18.41%). Of cases positive for gonorrhea, 198/203 (97.5%) have pyuria with 146/198 (73.7%) sterile pyuria. Of cases positive for chlamydia, 156/511 (30.5%) have pyuria with 108/156 (69.2%) being sterile. Of cases with vaginal trichomoniasis, 53/114 (46.5%) have pyuria with 46/53 (86.8%) sterile. There were correlations between gonorrhea and vaginal trichomoniasis and pyuria (OR 1.752 [95% 1.231 – 2.493]) and (OR 2.234 (95% 1.475 – 3.384)) respectively. In addition, vaginal trichomoniasis and white blood cells on the wet prep were statistically associated (OR 7.557 (95% 1.818 – 3.162)). Table 1. Demonstrates the details of these statistical comparisons.

Variables	Odds Ratio	95% Confidence	Probability
Gonorrhea and Pyuria	1.752	1.231 – 2.493	0.0026
Chlamydia and Pyuria	0.709	0.462 – 1.090	0.1469
Trichomoniasis and Pyuria	2.234	1.475 – 3.384	0.0002
Gonorrhea and WBCs on Wet Prep	1.441	0.795 – 2.615	0.2855
Chlamydia and WBCs on Wet Prep	1.735	1.94 – 3.197	0.1159
Trichomoniasis and WBCs on Wet Prep	7.221	1.818 – 3.162	0.0004

Table 1: Statistical Associations among tested variables

DISCUSSION

In the ED, the presence of pyuria is commonly used as an empiric diagnosis of urinary tract infection (UTI) in women evaluated for pelvic complaints. Pyuria is occasionally used to obviate further examination for STI. We suspect that the urine leukocytes seen in cases with positive STIs are often due to contamination from the STI or extension of inflammation to the adjacent urinary bladder – rather than a true urinary tract infection. If true, emergency physicians are likely over-treating this patient population with an expanded antibiotic regimen. In addition, the potential exists that a number of women are not having their pelvic infections fully addressed.

Our study is consistent with previous studies in demonstrating that a large proportion of women with STIs have pyuria. Of the STIs tested in our study, gonococcal infection and vaginal trichomoniasis are most likely to be associated with pyuria – with the majority of this being sterile pyuria. Urine results should be interpreted in the context of patient symptoms and presentation (2). Full evaluation for STI is warranted in sexually active women with dysuria, particularly those with pyuria but no bacteriuria (3 - 5). Studies demonstrate that up to 50% of women with pelvic complaints and pyuria actually have a STI (6, 7). Previous studies have not determined if urine cultures of STI patients treated for coexisting UTI yielded positive growth. We find that between 70 to 80% of the STI patients have sterile pyuria. This obviously brings to question the utility of pyuria in making a decision about the presence of a urinary tract infection or absence of STI.

The addition of antibiotics to a treatment regime to treat presumed UTI in a patient with STI deserves consideration. Over-treatment of UTIs can lead to antibiotic resistance, increased costs as well as suppression of normal bacterial flora and superinfections (8, 9).

CONCLUSIONS

This study demonstrates a high prevalence of sterile pyuria in female patients with concomitant STIs. This suggests that reliance on the finding of pyuria to initiate empiric treatment for a presumed coexisting urinary tract infection likely results in substantial antibiotic over-treatment in this population. In addition, reliance on pyuria as an empiric diagnostic test for UTI is not reliable. Given the high number of patients with STIs and sterile pyuria, emergency physicians should be diligent regarding suggesting full pelvic examination and laboratory analysis when the diagnosis is not clear.

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Heat Casualty Characteristics from a Marathon

Kristen Warnock DO , David E. Hogan DO MPH Adjunct Professor

Integris Southwest Medical Center, Emergency Medicine Residency Program; Oklahoma City, Oklahoma



Introduction: In 2013 over 541,000 runners completed a Marathon (1). Several million tried. The most common cause of morbidity and mortality is heat stroke (2, 3). Rapid identification and cooling of such casualties reduces the risk of death and disability (4, 5). Evidence exists that many such casualties may be treated on-site and discharged home to follow-up (6). This practice has become “standard” at most marathon events in the United States. This study is a report of the medical activities during a Midwestern Marathon event in association with the major heat casualties evaluated and treated. The study setting is a large Midwestern Marathon.

Methods: A prospective study of casualties requiring cryotherapy on-site for a 26 mile marathon event. Data are collected prospectively. Following disposition all casualties are contacted directly out to 30 days post event. All casualties are anonymous. The study was exempt from consent. All casualties with heat stroke are treated with ice tank cryotherapy on-site. Data are analyzed using descriptive statistics, as well as Student’s t test, Fisher’s Exact test and the Mann-Whitney U test for nonparametric data where indicated.

Results: 16,000 participants entered the full 26 mile (42 km) event. Of these 2,750 (17.2%) - 1,135 females and 1,615 males - completed it. A total of 22 (0.14%) runners were evaluated for heat exhaustion or heat stroke and underwent cryotherapy (N = 22, Male = 13, Female = 9) mean age of 30.55 years (Range 56 – 17, median 31, mode 34). The mean distance to collapse is 11.75 km (Range 42 – 4, median 6.2, mode 6.2). Mean time to initiation of cryotherapy 7.64 minutes, (Range 10 – 5, median 8, mode 10). Mean duration of cryotherapy is 18.45 minutes (Range 28 – 5, median 18.45, mode 20). The mean arrival core temperature is 41.18°C (Range 45.5 – 40.55, median 41.11, mode 40.55). The mean discharge core temperature is 38.40°C (Range 38.88 – 37.77, median 38.33, mode 38.33). The mean temperature reduction is 2.78°C (Range 6.62 – 1.67, median 2.78, mode 1.67). The mean treatment time is 118.09 minutes (Range 178 – 58, median 120, mode 150). There is a correlation between higher arrival core temperature and overall duration of treatment time ($p < 0.005$). Of the 22 cases 5 (22.7%) presented with syncope followed by a generalized seizure. Four casualties (18.2%) presented with syncope without seizure. The remaining 13 (59%) casualties presented with altered mental status without syncope or seizure. All casualties are discharged home with follow-up after recovery. All underwent follow-up contact out to 30 days post event and reported no serious adverse complications.

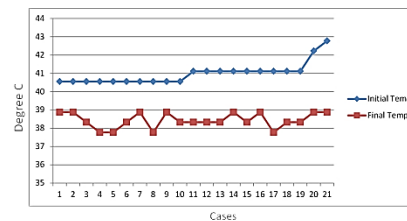


Figure 1. Initial Core Temperature and Final (Discharge) Core Temperature



Figure 2: Simple Ice Bath

Discussion: Since the reintroduction of the modern Olympic Games in 1896 the marathon has gained in popularity as an endurance event. In 1980 there were 150,000 Marathon runners in the United States (7). This increased to over 2 million in 1,100 races in 2013 (1). Participation is expected to grow. As participation increases, so does the risk of serious health incidents. Although exercise is an adjunct to health, marathons are an endurance event that can - even with proper training - result in significant morbidity and mortality (6). Sudden cardiac arrest is the most common cause of death in marathon participants - although it is still uncommon at 1/57,000 participants (8). The most common cause of significant injury and mortality is heat stroke (2, 3). Although a high heat index increases the risk of heat stroke, such weather conditions are not a requirement (9). Management revolves around rapid identification and cooling of casualties many of whom may be discharged home with follow-up from the site (4, 5).

Conclusions: This study supports the safety of treating heat stroke on-site and discharging patients home with careful follow-up. Casualty characteristics and cryotherapy treatment durations are consistent with previous reports.

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Clinical Findings and Abnormal Chest X-Rays in Wheezing Children

Tara Stewart DO PGY IV, Christopher Bass DO PGY IV, Chelsey Gilbertson DO MBA Adjunct Asst. Professor,
David Hogan DO MPH Adjunct Professor, Marty McBee DO MBA Adjunct Asst. Professor, Patrick Cody DO MPH Adjunct Asst. Professor



Integris Southwest Medical Center, Emergency Medicine Residency Program
Oklahoma City, Oklahoma

Introduction: The Emergency Department (ED) is frequently utilized for the evaluation and treatment of dyspneic children. Chest radiographs are often ordered on wheezing children. Due to the cumulative health effect of radiation, any exposure is a concern. The indications for and clinical utility of chest x-rays in wheezing children are not clear. The purpose of this study is to determine if there is a correlation between historical and clinical findings and an abnormal chest x-ray in wheezing pediatric patients with a history of asthma.

Study Setting: A metropolitan ED and associated emergency medicine residency program with a general census of >95,000 patient visits yearly of which approximately 5,000 are pediatric asthma cases.

Methods: This is a prospective observational non-interventional cohort study. Sequential pediatric patients (age 0 to 18 years) with a history of asthma or previous wheezing presenting to the emergency department with respiratory symptoms are invited to participate. This study obtained approval through the local Institutional Review Board. Descriptive analysis is provided and the Pearson Chi-square test for two categorical variables is used for comparisons. Linear regression is performed for all variables as well. Variables meeting statistical significance have test characteristics calculated for prediction of abnormal chest x-ray.

FACTOR
Accessory Muscle Use
Crackles on pulmonary examination
O ₂ needed to maintain saturation
History of Steroid Use in the last 60 days
Prior Asthma Admission
Prior ICU Admission for asthma
Current need for admission
Concurrent upper respiratory symptoms
Taking routine asthma control medications
Abnormal room air pulse oximetry
Tachypnea age adjusted
Tachycardia age adjusted
Febrile



Results: In total 54 cases are enrolled (age range 3 months to 18 years, mean 5.87, median 5, mode 2 years) with 41 males and 14 females. The variables tested are demonstrated in Table 1. No difference in the probability of an abnormal chest x-ray was noted based on age ($p = 0.48$) or sex ($p = 0.32$). Only a fever was noted to reach statistical significance under linear regression with an abnormal chest x-ray ($p = 0.020$). Calculation of test characteristics for fever and abnormal chest X-ray demonstrate Sensitivity 0.31, Specificity 0.81, PPV 0.63 and NPV 0.68.

Discussion: Studies are limited but suggest obtaining chest x-rays on asthmatic children with poor response to treatment, fever, and clinical findings of pneumonia or aspiration (1 - 5). Overall routine chest x-rays have a limited utility in asthmatic children (6). Some suggest that a 95% sensitivity for an abnormal chest x-ray can be obtained through evaluation of a set of historic and clinical findings (7). Others dispute this finding entirely (8).

Conclusions: This study demonstrates a level of correlation between an abnormal chest x-ray and the presence of a fever in asthmatic children. However the test characteristics of fever with chest x-ray alone are probably insufficient to trigger ordering one.

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