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Research Article

Eosinophiluria in relation to Pyelonephritis in Women

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Abstract: In the present study of outpatient settings, pyelonephritis was diagnosed by the history and physical examination and supported by urinalysis results. After a clinco-pathological confirmation of pyelonephritis in 100 female patients in the age group between 18-55 years were selected. The urine samples were subjected for routine urine analysis and urine sediment was stained with Wright-Giemsa stain. A total of 13% of these patients had eosinophils in urine. Eosinophiluria is defined as the presence of more than 1% eosinophils in urinary sediment under the microscope. Eosinophiluria proved to be good predictors of pyelonephritis, however, it is not specific. Positive test for pyuria of moderate to severe were seen in all (100%) of the cases. Microscopic hematuria was seen in 18% cases. We have found that Wright-Giemsa stain results show consistent results and eosinophils were more easily recognized. Demographic data collected were age, weight, gravidity, and parity. The gestational age of diagnosis was recorded.

Keywords: Urine, Wright-Giemsa Stain, Eosinophiluria.

1. Introduction

Pyelonephritis is a common bacterial infection of the renal pelvis and kidney that usually results from ascent of a bacterial pathogen up the ureters from the bladder to the kidneys. It is most often seen women of reproductive age. History and physical examination are the most useful tools for diagnosis.

APPROACH CONSIDERATIONS FOR DIAGNOSIS OF PYELONEPHRITIS

Category	Finding
History	Urine Frequency, Urgency, Dysuria UPPER Flank pain GIT Symptoms: Nausea, Vomiting, Abdominal pain
Physical	Fever high grade with Chills and rigors, Tachycardia, Hypotension Costovertebral angle tenderness Abdominal and/or suprapubic tenderness

LABORATORY DIAGNOSIS OF PYELONEPHRITIS

1. Positive Leukocyte esterase test.
2. Gross Pyuria.
3. Microscopic Pyuria.
4. Gross Hematuria.
5. Microscopic Hematuria.
6. WBC casts Indicative of renal origin.
7. Blood: Moderate to severe degree of neutrophilic leukocytosis with shift to left.
8. Positive blood culture in 20-30% cases.

2. Materials and Methods

The study was carried out during September 2014 to July 2015, in R.D. Gardi Medical College, Ujjain, in the Department of Pathology. 100 women patients suffering from clinical pyelonephritis were subjected for the eosinophiluria.

2.1 Collection of Urine Sample

Clear verbal instructions were given to all the patients regarding the proper collection of urine.

Fresh clean-catch midstream sample, collected in the urine container without any preservatives in the laboratory itself.

2.2 Exclusion Criteria for Rejection of Sample

Samples brought from home were not included in the study.

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2.3 Time to Process the Sample

In all cases, it was done within 1 hour after collection.

2.4 Specimen Preparation

12ml of the freshly voided well-mixed urine sample was centrifuged in a 15ml glass conical tube at 450 rpm for 5 minutes. 11ml of urine was transferred to another tube for routine chemical testing by DIPSTICK method and 1ml of remaining urine was resuspended in the same tube (12:1 concentration).

2.5 Slide Preparation

Slide was labeled on the frosted end with patient's name, date, and accession number, before staining. 2 drops of well-mixed concentrated urine were placed on the slide and spread slightly. Those urine samples found to be negative for protein a drop of 22% bovine serum albumin was added so that cells adhered to the slide.

The slide was allowed to dry at room temperature. It was then fixed with methanol for a few seconds. The slide was ready for staining.

2.6 Staining Procedure

The slide was placed on a staining rack and 1ml of Wright-Giemsa stain was poured on the smear for 3 minutes. Later on, the slide was poured with 2ml distilled water for 3 minutes. The slide was then rinsed with tap water and allowed it to dry at room temperature.

2.7 Examination of Slide

Slide was first examined under low power (10X objectives) and then oil immersion (100X objectives).

2.8 Reporting of Slide

Report was prepared by counting the percentage of eosinophils seen in 100 white blood cells by using laboratory counter.

In smear having less than 100 polymorphs, the eosinophils were reported as a number of eosinophils seen.

3. Observation and Results

A total of 100 patients were included in the present study for analysis.

Age	Number	Percentage	Positive result for eosinophiluria
18-29	50	50	10
30-39	30	30	02
40 -55	20	20	01
Total	100	100	13

A total of 100 patients were coded as pyelonephritis. Out of 100 patients, 12% were pregnant. Of the total 100 patients (13%) had a positive test for eosinophiluria by Wright-Giemsa stain. On urinalysis 100% of cases had pyuria, 34% were dipstick leukocyte esterase test (LET) positive, and 30% had microscopic hematuria. The presence of WBC casts seen in 11% of cases indicating of renal origin. The highest percentage of eosinophiluria was observed in the age group of 18-29. LET results have a sensitivity of 75% for detecting more than 10 WBC/HPF.

4. Discussion

4.1 Wright-Giemsa Stain for detection of Eosinophiluria

- **Principle:** The most important components of these stains are oxidized methylene blue, azure B, and eosin Y dyes. The eosin Y dye stains the cytoplasm of cells an orange to pink color. Wright-Giemsa stain is routinely used to differentiate eosinophils and neutrophils in urine sediment. The eosinophils with their bright-red staining granules stand out from the contrasting pink-blue color of the neutrophils in urine sediment. Eosinophils will show large, bright red to orange-red with bilobed nucleus. Neutrophils have smaller blue-pink stained granules with more than 2 lobes. Granule staining can be variable. Nuclear lobulation and size of granules are used to differentiate between eosinophils from neutrophils.

4.2 Staining Characteristics of Wright-Giemsa Stain

Erythrocytes	Yellowish red
Pus cell cytoplasm	Pale pink, fine granules
Eosinophils granules	Red to orange coarse granules

The most common method for detection of eosinophils in urine is based on the microscopic examination of the air-dried; Wright-Giemsa stained preparation under the oil immersion lens. Normally not more than 1% eosinophils present in urine. If the figure exceeds more than 5% it is considered abnormal test result. In our study, the percentages of eosinophils were 13%. Pyuria is defined as the presence of more than 5 pus cells per HPF on microscopic examination of the urinary sediment.

5. Conclusion

Pyelonephritis is a common bacterial infection in young adult women. It is one of the leading causes of nonobstetric antepartum hospitalization. Several studies have demonstrated maternal and fetal morbidity associated with pyelonephritis. The presence of eosinophiluria is a supportive finding in cases of pyelonephritis, however, it is not specific. Eosinophiluria is routinely detected by Wright-Giemsa stain.

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