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Beyond the Cataract: Clinically Significant Urinary Pathology Detected During Preoperative Evaluation—A Case Series"

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Abstract

Background
Cataract surgery is one of the most frequently performed ophthalmic procedures. Preoperative assessment is primarily directed toward identifying systemic conditions that may influence perioperative safety. Abnormal urinary findings, particularly pyuria, may be encountered during preoperative evaluation. Although pyuria is nonspecific and does not by itself establish urinary tract infection, marked or persistent pyuria may occasionally be associated with significant underlying urinary tract pathology.

Methodology
This was a descriptive case series of three patients who were evaluated for cataract surgery and in whom significant pyuria was identified during preoperative assessment. The cases were selected because the urinary abnormality prompted further urological evaluation and led to identification of clinically significant urinary pathology. Patient demographic characteristics, urine microscopy findings, subsequent urological investigations, diagnoses, interventions, and the timing of subsequent cataract surgery were obtained from the available clinical records. No intervention was assigned by the investigators, and no control group was used. The findings were summarized descriptively without inferential statistical analysis because of the small sample size. The purpose of the case series was to describe clinically important diagnoses encountered after significant pyuria was detected, and not to estimate prevalence or establish a causal relationship between pyuria and urinary pathology

Conclusion
These cases highlight that significant pyuria detected during preoperative evaluation may occasionally be the first indication of clinically important urinary tract pathology. Pyuria should not be interpreted in isolation as evidence of urinary tract infection, nor should these three cases be taken to support universal urine screening before cataract surgery. Rather, when significant or unexplained pyuria is encountered, appropriate clinical correlation and, when indicated, urological evaluation may identify treatable pathology and facilitate safe subsequent surgery.

I. Introduction

Cataract is a major cause of visual impairment worldwide, and cataract extraction is among the most commonly performed surgical procedures. Modern cataract surgery is generally performed under local or topical anesthesia and has a favorable safety profile. Consequently, extensive routine laboratory investigation is not necessarily required for every patient and should be guided by the patient's clinical condition and institutional protocols. [1,2]

Urinary abnormalities may nevertheless be detected during preoperative assessment. One such finding is pyuria, defined by the presence of increased numbers of leukocytes in the urine. Pyuria is a marker of urinary tract inflammation but is not specific for bacterial infection. It may occur in urinary tract infection, urinary calculi, obstruction, malignancy, inflammatory conditions, and other urinary tract disorders. Contemporary guidelines emphasize that pyuria alone should not be equated with urinary tract infection or automatically treated with antibiotics. [3,4]

In patients undergoing elective non-urological surgery, current Infectious Diseases Society of America guidance recommends against routine screening for or treatment of asymptomatic bacteriuria. This distinction is important because the presence of pyuria does not establish asymptomatic bacteriuria or symptomatic urinary tract infection. [4]

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However, the clinical significance of a markedly abnormal urine examination may extend beyond the question of bacteriuria. Significant pyuria may occasionally prompt further investigation and lead to the diagnosis of previously unrecognized structural or infective urinary tract disease. [3,4]

We present three cataract surgery candidates in whom significant pyuria identified during preoperative assessment was followed by further urological evaluation and diagnosis of clinically important urinary pathology. The purpose of this case series is not to advocate universal urine screening before cataract surgery, but to emphasize appropriate interpretation and clinical follow-up of significant urinary abnormalities when they are identified.

Case 1: Renal empyema in a patient with marked pyuria

A 75-year-old male patient was evaluated as part of the preoperative assessment before planned cataract surgery. Urine microscopy revealed marked pyuria, with more than 100 pus cells/HPF.

In view of the marked urinary abnormality, further urological evaluation was undertaken. The patient was diagnosed with renal empyema.
The patient underwent drainage/removal of the purulent collection and received antibiotic therapy before and after the procedure.
Following appropriate treatment and clinical stabilization, the patient subsequently underwent cataract surgery.
This case illustrates that marked pyuria in an elderly cataract patient may occasionally be associated with significant upper urinary tract pathology requiring intervention.

Case 2: Ureteric calculus detected following pyuria

A 60-year-old male patient was evaluated before cataract surgery. Urine microscopy demonstrated 50 pus cells/HPF.

Because of the abnormal urinary findings, further urological investigation was performed. CT KUB demonstrated a ureteric calculus.

The patient subsequently underwent ureteroscopic lithotripsy (URSL) for management of the ureteric stone.
After appropriate urological treatment and stabilization, the patient underwent cataract surgery.

This case demonstrates that pyuria may accompany urinary calculi and that further investigation can identify a structural cause for the urinary abnormality.

Case 3: Bladder calculus associated with cystitis

A 50-year-old male patient was evaluated before planned cataract surgery. Urine microscopy revealed 20–25 pus cells/HPF.

Further urological evaluation was performed, including cystoscopy. A urinary bladder calculus associated with cystitis was identified.

The patient underwent cystoscopic management with removal of the urinary bladder stone.

Following resolution/appropriate treatment of the urinary pathology, cataract surgery was subsequently performed.

This case demonstrates that even a moderate degree of pyuria may be associated with an underlying structural urinary abnormality.

Discussion

The three cases presented here share a common clinical sequence: an abnormal urine examination was identified during evaluation for cataract surgery, further investigation was undertaken, significant urinary pathology was diagnosed, appropriate urological management was performed, and cataract surgery was subsequently undertaken.

The important observation is that pyuria is a finding rather than a diagnosis. The presence of leukocytes in urine indicates inflammation within the urinary tract but does not establish the cause. The 2026 European Association of Urology guidance emphasizes that pyuria may suggest infection but lacks specificity in several clinical settings. Evaluation should therefore incorporate symptoms, microbiological findings and, where appropriate, imaging. [8]

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Table 1

Case	Age/Sex	Urine pus cells	Further investigation	Final diagnosis	Urological treatment	Outcome
>100 cells/HPF	75 years / Male	Urological evaluation and imaging	Renal empyema	Drainage/removal of pus with pre- and post-treatment antibiotics	Subsequently underwent cataract surgery	
50 cells/HPF	60 years / Male	CT KUB	Ureteric calculus	URSL (ureteroscopic lithotripsy)	Subsequently underwent cataract surgery	
20–25 cells/HPF	50 years / Male	Cystoscopy	Bladder calculus with cystitis	Cystoscopic removal of bladder ston	Subsequently underwent cataract surgery	

In the present series, the underlying conditions were substantially different. The first patient had renal empyema, representing significant upper urinary tract infective pathology. The second patient had a ureteric calculus, while the third had a bladder calculus associated with cystitis. Thus, the degree of pyuria did not directly predict the underlying pathology.

The first case is particularly noteworthy because marked pyuria was associated with a serious upper urinary tract condition requiring drainage and antimicrobial treatment. In patients with suspected complicated urinary infection, imaging may be important for identifying obstruction, stones, abscesses or other complications. Current EAU guidance recommends imaging of the urinary tract when urgent urological disorders or complications are suspected. [8]

The second and third cases highlight the relationship between urinary calculi and urinary inflammation. Stones can produce urinary tract irritation and may coexist with infection or obstruction. Identification of a calculus is clinically important because management may require an interventional urological procedure rather than treatment based solely on an assumption of uncomplicated urinary tract infection. [8]

From the ophthalmic perspective, an important question is whether urine examination should routinely be performed before cataract surgery. The present three cases cannot answer this question. Current evidence does not support routine screening for asymptomatic bacteriuria before elective non-urological surgery, and unnecessary antimicrobial treatment can contribute to adverse effects and antimicrobial resistance. (Infectious Diseases Society of America) [1,2,4]

Therefore, the message from this case series should not be that every patient undergoing cataract surgery requires urine microscopy. Instead, the cases emphasize the importance of appropriate clinical interpretation when significant urinary abnormalities are encountered. Particularly marked, persistent, unexplained or clinically discordant pyuria may warrant additional assessment rather than being automatically dismissed as contamination or treated empirically without establishing the underlying cause. [3,4]

Another important distinction is between pyuria and asymptomatic bacteriuria. Asymptomatic bacteriuria is defined by significant bacterial growth in urine in the absence of urinary symptoms and may occur with or without pyuria. Consequently, a high pus-cell count alone does not establish asymptomatic bacteriuria. [4]

The decision to investigate a patient should therefore be individualized according to the degree of pyuria, symptoms, age, comorbidities, previous urinary tract disease, renal function, recurrent urinary infections, and other clinical findings. Where significant disease is suspected, urine culture, renal function testing and appropriate imaging or specialist referral may be warranted.

Our case series has several limitations. First, it contains only three patients and therefore cannot establish prevalence or causality. Second, detailed microbiological and imaging information is currently unavailable for inclusion in the manuscript. Third, because these patients were selected after abnormal urine findings were identified, the cases are subject to selection bias. Finally, the series cannot determine whether routine urine screening before cataract surgery improves surgical outcomes.

Nevertheless, the cases provide a clinically relevant observation: an apparently simple preoperative urinary abnormality may occasionally lead to the diagnosis of significant and treatable urinary pathology.

II. Conclusion

Significant pyuria identified during preoperative evaluation of cataract surgery candidates may occasionally be associated with clinically important underlying urological disease. In this three-case series, further evaluation of pyuria led to the diagnosis of renal empyema, ureteric calculus, and urinary bladder calculus associated with cystitis.

These cases do not provide evidence for universal urine screening before cataract surgery. Rather, they emphasize that when significant pyuria is identified, it should be interpreted in its clinical context and, when appropriate, investigated to exclude important underlying urinary tract pathology.

A collaborative approach between ophthalmologists, physicians and urologists may facilitate appropriate management of such patients and allow cataract surgery to proceed after stabilization of relevant systemic disease.

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