

EVALUATION OF HAEMATURIA

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Section 1 Introduction

Haematuria – the passage of red blood cells in the urine – is indicative of underlying urological or nephrological disease most of the time. Haematuria may result from relatively simple conditions e.g. uncomplicated urinary tract infection to life-threatening conditions. e.g. urinary tract malignancy. The more important causes include malignancy (bladder cancer, renal cancer and upper urinary tract transitional cell cancer), urinary tract stones and nephrological disease (e.g. IgA nephropathy, glomerulonephritides). [Table 1] This necessitates careful clinical and investigative evaluation of patients and appropriate referral. An awareness of the importance of haematuria is required from caregivers at all levels of the health care system and a well coordinated referral system is vital for the early diagnosis and saving of lives.

CAUSES OF HAEMATURIA	
UROLOGICAL DISEASE	
•	<i>Urinary Tract Malignancies</i>
-	Bladder Cancer
-	Renal Cancer
-	Upper Urinary Tract Transitional Cell Cancer
•	<i>Urinary Tract Stones</i>
▪	<i>Urinary Tract Infections [including GU Tuberculosis]</i>
▪	<i>Urological Trauma</i>
▪	<i>Prostate Disease:</i>
-	Benign Prostate Hyperplasia ,
-	Prostate Malignancy
NEPHROLOGICAL DISEASE	
•	<i>IgA Nephropathy</i>
•	<i>Glomerulonephritides</i>
(N.B. This is not a comprehensive list of causes of Haematuria)	

Table 1

It is important to note that the presentation of haematuria could take two forms – **macroscopic haematuria** which is often alarming to the patient and **microscopic haematuria** that is detected during microscopic examination of urine. Both these types need adequate clinical and investigative evaluation and appropriate treatment. In a referral-based study done in

Sri Lanka, urological malignancy was found in 21.2% of the study group, and all of them were over the age of 40 years. ⁱ In population-based studies done abroad up to 8.3% of patients were found to have had microscopic haematuria. ⁱⁱ Significant urological diseases (including tumours) were found in 5 – 33% of such patients. It has been concluded that **haematuria** – gross or microscopic – **is a significant finding and it requires evaluation**, after considering the economic cost benefits, the risks and morbidity involved in haematuria evaluation. ⁱⁱⁱ

Section 2 Definitions

MACROSCOPIC HAEMATURIA is the passage of red coloured urine due to the presence of red blood cells in the urine. The degree of colouration could be of varying hues and intensities. Red coloured urine may rarely be the result of the ingestion of certain types of food, drugs (e.g. rifampicin) and acute porphyrias. In the case of a doubt, microscopic examination of the urine is mandatory.

MICROSCOPIC HAEMATURIA is detected during urine microscopy. It is defined as **3 or more red cells** per high power microscopic field (hpf) in the urinary sediment. Ideally it should be from a freshly voided, clean catch midstream urine specimen

Section 3 Evaluation of Patients

HAEMATURIA IN ADULTS

MACROSCOPIC HAEMATURIA

All patients with macroscopic haematuria should be evaluated focusing on important underlying urological disease. Macroscopic haematuria is an alarming symptom to the patient and it may signal the presence of serious underlying urological disease.

MICROSCOPIC HAEMATURIA

Microscopic haematuria is detected during urine microscopy. Patients with microscopic haematuria need to be carefully screened considering the following:

- the necessity for any further comprehensive evaluation,
 - underlying nephrological disease (and subsequent referral), and
 - screening for underlying urological disease.
-
- **MICROSCOPIC HAEMATURIA: NECESSITY FOR FURTHER EVALUATION**

A subgroup of patients with microscopic haematuria in the presence of menstruation, urinary tract infection, exercise-induced episodes, recent sexual intercourse

need to have a repeat urinalysis 2 weeks later. If the repeat examination too is positive, the patient will require further evaluation.

MICROSCOPIC HAEMATURIA: SCREENING FOR UNDERLYING NEPHROLOGICAL DISEASE:

- If a patient with microscopic haematuria has evidence of underlying renal disease, then he/she should be referred for nephrological evaluation. [Table 2]

INDICATORS OF UNDERLYING NEPHROLOGICAL DISEASE IN PATIENTS WITH MICROSCOPIC HAEMATURIA
<ul style="list-style-type: none">▪ SIGNIFICANT PROTEINURIA<ul style="list-style-type: none">- 1g/24 hours or- 0.5g/24 hours if persistent/ increasing Proteinuria
<ul style="list-style-type: none">▪ EVIDENCE OF RENAL IMPAIRMENT IN BLOOD BIOCHEMISTRY<ul style="list-style-type: none">- elevated levels of Serum Creatinine
<ul style="list-style-type: none">▪ EVIDENCE OF GLOMERULAR BLEEDING<ul style="list-style-type: none">- Presence of dysmorphic red cells, red cell casts in the urine (Figures 1 and 2)
<ul style="list-style-type: none">▪ OTHER EVIDENCE SUGGESTIVE OF NEPHROLOGICAL DISEASE, HYPERTENSION, DIABETES MELLITUS

Table 2

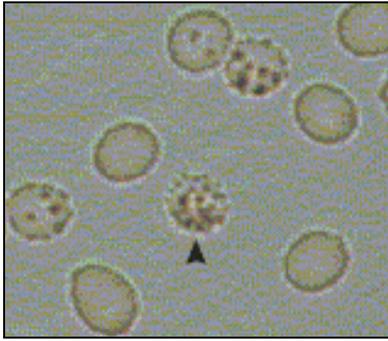


Figure 1:
Evidence of nephrological disease in microscopic examination of urine:
Dysmorphic Red Cells



Figure 2: Evidence of nephrological disease in microscopic examination of urine: **Red Cell Casts**

- **MICROSCOPIC HAEMATURIA: SCREENING FOR UNDERLYING UROLOGICAL DISEASE**

- Patients with persistent microscopic haematuria require evaluation for underlying urological disease as decided based on each individual clinical situation

by a specialist clinician. [the presence of microscopic haematuria, in two samples of urine taken 2 weeks apart is considered as persistent microscopic haematuria)

- Patients on anticoagulants (e.g. warfarin) or antiplatelet drugs (e.g. aspirin) should be evaluated as any other case in the presence of microscopic haematuria.

HAEMATURIA IN CHILDREN

Paediatric patients (< 12 years) with either microscopic haematuria or macroscopic haematuria need initial evaluation by a consultant paediatrician and referred for urological / paediatric surgical evaluation only if the paediatrician deems it to be necessary.

SPECIFIC UROLOGICAL EVALUATION

Urological evaluation is required for

- **all patients** with macroscopic haematuria;
- Patients with persistent microscopic haematuria, as decided by a specialist clinician based on the individual clinical situation

This entails clinical evaluation (history and examination) and relevant investigative evaluation for each patient.

UROLOGICAL EVALUATION: CLINICAL ASPECTS

Clinical evaluation of a patient with macroscopic haematuria should proceed with clinical history and relevant physical examination.

1. CLINICAL HISTORY:

- Duration of present episode of haematuria, progress of the bleeding – increasing, lessening or varying in intensity, presence of clots or fleshy

pieces, previous such episodes anytime in the past.

- Evidence of Urinary Tract Infection: dysuria, hypogastric pain, loin pain, fever
- Lower urinary tract symptoms (LUTS) ^{iv}:
 - (a) *Voiding symptoms* (experienced during the voiding phase):
 - hesitancy, slow stream, intermittency
 - (b) *Storage symptoms* (experienced during the storage phase):
 - increased frequency, nocturia, urgency, urge incontinence
 - (c) *Post Micturition symptoms* (experienced immediately after micturition):
 - feeling of incomplete emptying, post micturition dribble
- In women, time of menstruation and any tendency for irregular periods
- History of previous urinary tract diseases, urological surgery or fragmentation of stones;
- History of pelvic irradiation.
- History of tuberculosis
- Smoking

- Occupation: dye industry, handling of petroleum products
- Drugs: aspirin, warfarin, clopidogrel

2. PHYSICAL EXAMINATION:

- Look for pallor
- Abdomen for renal masses, pelvic masses. Percussion for the bladder dullness.
- Examine the genitalia by careful inspection of the urethra and vagina in women, including a vaginal examination in married women.
- The penile urethra should be carefully examined for any lumps due to tumour or stones. The prepuce must be pulled back and the glans fully inspected along with the external meatus.
- A digital rectal examination of the male [Table 3]

DIGITAL RECTAL EXAMINATION

The examination should be done with consent, with the patient in lateral position.

It is necessary to inspect for haemorrhoids, anal fissures and then feel the prostate and the seminal vesicles if possible.

He should be reassured that it is not painful, asked to open the mouth and breath deeply to get him to relax, and a well lubricated gloved finger inserted with the nail of the finger parallel to the bed.

Once it is in the anus, gently move the finger to feel the prostate. It has two lobes and a groove. The consistency is like the tip of the nose. If it is unusually tender and the consistency is like the cheek, you maybe dealing with Prostatitis.

If it is hard as the bridge of the nose and irregular, there **may be** cancer. Obliteration of the median groove is also suspicious. The seminal vesicles are above the prostate and not usually palpable. If they are, and continuous with the prostate growth, it is probably a prostatic cancer.

These patients will need a referral to surgeon/urological surgeon

Table 3

UROLOGICAL EVALUATION: INVESTIGATIONS

The investigative evaluation should focus on finding causative conditions and arriving at a definitive diagnosis.

1. INVESTIGATION OF URINE AND BLOOD

- They need to have urinalysis (including microscopy), urine culture/antibiotic sensitivity test (ABST) and Serum Creatinine for the basic assessment of renal function. They also need to have a full blood count to assess the degree of anaemia if any.
- Male patients over the age of 50 years would need a serum prostate specific antigen (PSA) assay if there is a clinical suspicion of carcinoma of the prostate.

2. **IMAGING** [Table 4]

- All patients should have **X-Ray KUB** and **Ultra Sound Scan KUB (USS-KUB)**
- **Intravenous Urography (IVU)** is indicated in the presence of urinary tract calculi, upper urinary tract (renal pelvic and ureteric) urothelial tumours or negative X-Ray KUB and USS-KUB.

CT Scan and MRI (magnetic resonance imaging), retrograde pyelography, antegrade pyelography and other imaging investigations should be optional

investigations decided by the specialist clinician based on the findings of the X-Ray KUB, USS-KUB and IVU.

IMAGING IN THE EVALUATION OF A PATIENT WITH HAEMATURIA

X-Ray KUB would show 90% of urinary tract calculi. 10% of calculi are radiolucent.

USS-KUB is a non-invasive imaging modality available freely. This will help to identify renal tumours of 2cm - 2.5cm or more, calculi, space occupying lesions in the renal pelvis (Non radio-opaque stones, urothelial tumours, and blood clots), bladder tumours and calculi.

IVU visualizes the entire urinary tract. It gives information on both the function and anatomy of the urinary tract.

CT-Scan Abdomen is excellent in characterizing the nature and affects of renal masses. Non-contrast enhanced spiral CT is more sensitive in detecting calculi more than the IVU.

MRI gives excellent information on soft tissues and helps in the differentiation of cysts from neoplasms.

Table 4

3. CYSTOSCOPY

Any patient over the age of 40 years with haematuria (painless or painful) should be assumed to be having bladder cancer until proved otherwise. Hence, cystoscopy is **mandatory** in these patients. USS-KUB is

operator-dependent and can miss the detection of bladder tumours.

In a patient over 40 years of age, even if the X-Ray KUB shows a urinary tract stone, a cystoscopic evaluation is deemed **mandatory**.

There is no place for biopsy of suspected bladder tumour at cystoscopy (flexible or rigid). Bladder tumours should be resected only in a urology department.

Thus Cystoscopy (rigid or flexible) is mandatory in

- **All patients over the age of 40 years**
- **Patients under 40 years whose imaging investigations are negative or if imaging show evidence of bladder or upper urinary tract urothelial tumour.**

Flexible cystoscopy is convenient to the patient and does not require general/spinal anaesthesia

[Urinary cytology and Tests for Tumour markers in the voided urine are optional investigations that suit specific situations as decided by specialist clinicians]

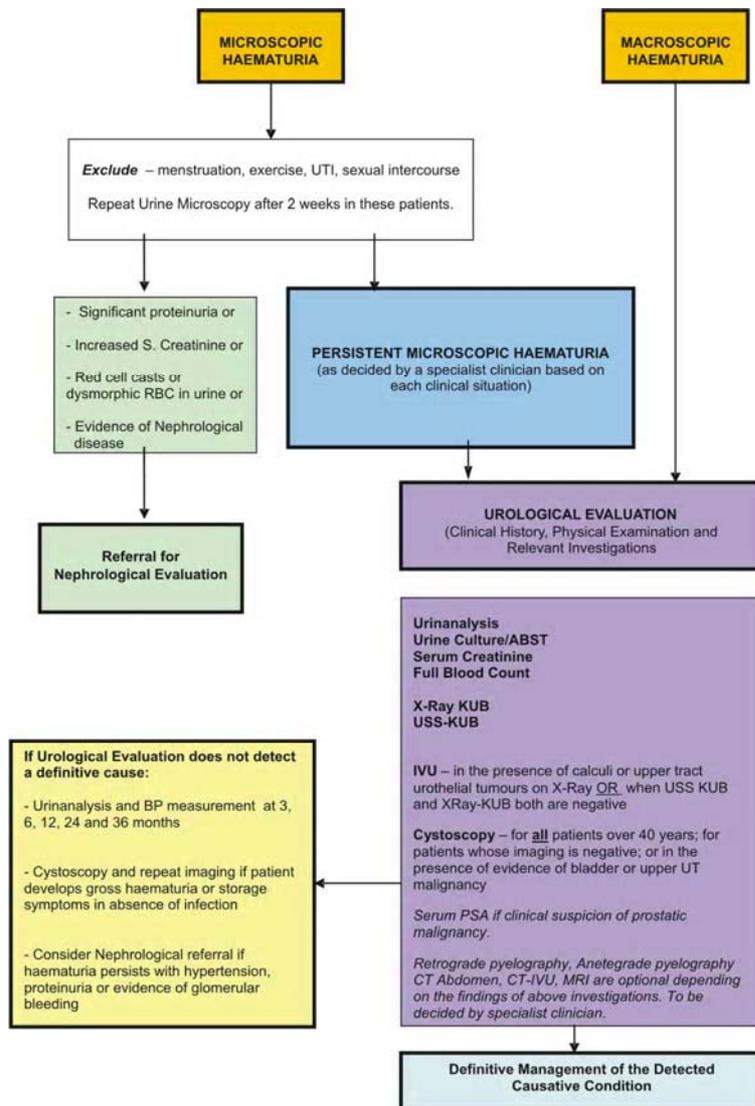
**ONCE THE SPECIFIC CAUSE FOR
HAEMATURIA IS FOUND, IT SHOULD BE
APPROPRIATELY TREATED.**

Section 5 FURTHER ACTION IF INVESTIGATIONS ARE NEGATIVE FOR A DEFINITE CAUSE

The likelihood of tumors developing within two to five years after a complete and negative haematuria evaluation is in the 0 to 3 percent range.^v Although evidence is insufficient, follow up is recommended.^{vi}

- Patient who has had negative urological evaluation should have urinalysis and blood pressure measurement at 6, 12, 24 and 36 months after the initial evaluation.
- Following negative urological evaluation, **immediate urological evaluation** including ultrasound and cystoscopy need to be done should the patient develop gross haematuria, or persistent storage type of lower urinary tract symptoms (LUTS) in the absence of a UTI.
- Further nephrological evaluation is required if there is persistent haematuria with hypertension, persistent proteinuria or dysmorphic red cells/ red cell casts in the urine.

Section 6 SUMMARY OF THE EVALUATION PATHWAY



Section 7 INSTITUTIONAL LEVELS OF EVALUATION

1. Institutions with Paramedics only

- All patients with *macroscopic haematuria* and *microscopic haematuria* should be referred to the nearest hospital with a medical officer.

2. Institutions with a Medical Officer only

- Patients with *microscopic haematuria*, requiring further evaluation should be referred to the nearest hospital with general surgical or urological services.
- All patients with *macroscopic haematuria* should be referred to the nearest hospital with urological services.

3. Institutions with General Surgical Services only

- The steps indicated in this protocol should be followed in cases of *microscopic haematuria* and *macroscopic haematuria*.

- Patients requiring cystoscopy or specific urological expertise in the evaluation should be referred to the nearest centre with urological services.

4. Institutions with Urological Services

- The steps indicated in this protocol should be followed in cases of *microscopic haematuria* and *macroscopic haematuria* by the General Surgical Units and other units in the Institution. Patients requiring cystoscopy or specific urological expertise in the evaluation should be referred to the local urology unit.

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