Diagnosis and Management of Haemorrhagic Cystitis

Introduction

Haemorrhagic cystitis is defined as a diffuse inflammation of the bladder due to either an infectious or non-infectious cause resulting in bladder mucosal bleeding.

Aetiology

Infections (particularly in children and immunocompromised)

-Viral
- BK virus (in 5.7-7.7% of post BMT patients, at one to four months post)
- JC virus, CMV, herpes virus

-Bacterial infections
- *E.coli*, *Klebsiella*, *Staphylococcus saprophyticus*, *Proteus mirabilis*

-Fungal
- *Candida Albicans*, *Cryptococcus Neoformans*, *Aspergillus Fumigatus* and *Torulopsis Glabrata*

-Worms
- *Schistosomiasis Haematobium*

Drugs
- Ifosfamide and cyclophosphamide
- Busulfan
- Thiotepa
- Allopurinol
- Penicillin

Others
- Radiotherapy for pelvic malignancies
- Chemicals (dyes, pesticides aniline, toluidine).

Presentation

Frequency, urgency, nocturia, dysuria
Microscopic haematuria up to 53% of patients
Macroscopic haematuria 0.6% to 15% (pink urine to exsanguinating haemorrhage)

Diagnosis

MSU to exclude uncomplicated bacterial UTI
Urine sample for BK virus PCR (EPR>BK virus (BKV) viral load PCR)
If severe symptoms/uncertain diagnosis > cystoscopy, USS KUB, CT or MRI urogram (d/w urology- ?clot burden)
ΔΔ Tumours, stones

Grading of Haemorrhagic Cystitis

0 – No symptoms of bladder irritability or hemorrhage

1 – Microscopic hematuria

2 – Macroscopic hematuria

3 – Macroscopic hematuria with small clots

4 – Massive macroscopic hematuria requiring instrumentation for clot evacuation and/or causing urinary obstruction.

Prevention

Patients receiving daily ifosfamide (any dose) or high dose cyclophosphamide (50mg/kg or $2g/m^2$)*

*R-Maxi Chop: cyclophosphamide $1200mg/m^2$

Mesna - Refer to individual NSSG protocol
Must be present in the bladder for effective prevention
Can be administered IV, S/C or oral

Maintain urine output >150ml/hour (oral, iv saline, furosemide)

Treatment

Keep platelets >50, normalise clotting

1. **If mild haematuria with no clots (Grade 1-2)**
   Outpatient treatment
   Oral hydration to maintain urine output >150ml/hr and consider increased dose of mesna
   Repeat urinalysis at 4-6 weeks to ensure microscopic haematuria resolved
   Consider anticholinergics to reduce bladder spasms

2. **Persistent haematuria especially with clots**
   Admit and seek urology advice
   Continuous irrigation of bladder with N saline
   Consider 3- way Foley catheter to drain clots
   Consider cystoscopy exploration under anaesthesia to extract clots and identify bleeding areas of mucosa

3. **Refractory haematuria and large clots despite above treatments** - Weak evidence – MDT
   Intravesical Alum (aluminium ammonium sulfate or aluminium potassium sulfate) - an astringent that promotes haemostasis
   Intravesical Aminocaproic Acid – a synthetic lysine that decreases fibrinolysis
   Intravesical silver nitrate- cauterise bleeding vessels
   Hyperbaric oxygen …. (especially for radiation induced haemorrhagic cystitis)
   Percutaneous nephrostomy drainage
   Iliac artery embolization
   Cystectomy

References:

Haemorrhagic cystitis in cancer patients, Up to Date, updated October 2019

Guidelines for the diagnosis, prevention and management of chemical- and radiation-induced cystitis, Thompson et al, Journal of Clinical Urology, 2013.

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Audit
These processes are subject to the OxBMT/IEC audit programme

Circulation
NSSG Haematology Website

Review

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