

CASE REPORT

Alum Irrigation for the Treatment of Intractable Haematuria

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Abstract

Managing intractable haematuria is a daunting task. One cause of this condition is radiation-induced haemorrhagic cystitis. Several treatments for the condition have been proposed and one non-invasive option is alum irrigation. Here, we report on a 65-year-old woman with intractable haematuria secondary to radiation cystitis who was successfully treated with alum irrigation. Alum irrigation is safe, well tolerated and relatively cheap. A review of the literature and a comprehensive discussion on alum irrigation as treatment for haematuria is discussed here to create an awareness regarding this treatment option.

Keywords: *intractable haematuria, radiation cystitis, alum irrigation, medical sciences*

Introduction

Intractable haematuria from the bladder can be life threatening and its management is challenging. Haemorrhagic cystitis is a condition that can cause intractable haematuria and has several causes, including pelvic radiation and systemic treatment with oxazophosphorine alkylating agents like cyclophosphamide. The incidence of radiation cystitis in general is between 3–15% (1). For the management of haemorrhagic cystitis, several different treatment modalities remain in use with varying degrees of success; one such treatment is alum irrigation. Here, we present a case of radiation-induced haemorrhagic cystitis that was successfully treated with alum irrigation. This case report will increase awareness among Malaysian medical practitioners regarding alum irrigation as a safe and effective option for the treatment of intractable haematuria.

Case Report

A 65-year-old Chinese woman was diagnosed with ovarian carcinoma 20 years ago and underwent a total abdominal hysterectomy and bilateral oophorectomy (TAHBSO) followed by external beam radiotherapy (1.5 Gy/fractions, 5

days/week for 4 weeks). Her postoperative and post-radiation course was uneventful until she presented with a 2 day history of frank haematuria, 20 years after TAHBSO. Laboratory investigations revealed normal renal function and coagulation profile. Ultrasound of the abdomen showed no evidence of calculi or focal renal lesions.

Cystoscopy was performed and demonstrated Radiation Therapy Oncology Group (RTOG) Grade 4 bladder telangiectasia, likely from radiation cystitis. No tumour or calculi were seen. Areas of bleeding were diathermized and bladder washout performed, however the haematuria persisted. This was repeated a number of times, nevertheless the haematuria continued. The patient was started on 1% alum irrigation at 250 mL/hr (6 L over 24 hours). She tolerated the treatment well, and after 24 hours the haematuria had stopped completely. Serum aluminium levels were normal and there were no signs or symptoms of aluminium toxicity. Before initiation of the alum irrigation, her serum aluminium level was 1.71 $\mu\text{mol/L}$ and International Normalised Ratio (INR) was 1.02. After alum irrigation, her serum aluminium level was 3.07 $\mu\text{mol/L}$ and INR was 1.34. She was discharged home the following day, after a period of clear urine was observed. At 3 months of follow-up, she had experienced no recurrence of haematuria.

Discussion

Complications of pelvic radiation include both acute and chronic bladder injuries. One sequela of chronic radiation-induced bladder insults is haemorrhagic cystitis. The incidence of haemorrhagic cystitis for cervical carcinoma treated with both intracavitary and external beam radiotherapy is reported at 6.5%. The median interval to developing haematuria following the completion of therapy was 35.5 months (2). Chronic radiation therapy can cause damage to the bladder submucosa, leading to necrosis of the vascular endothelium, vessel wall thickening and obliterative endarteritis. All of these changes result in hypoxia, hypovascularity and ischaemia, which can ultimately induce neovascularisation of vessels that are fragile and prone to bleeding.

There are many different treatments for haemorrhagic cystitis. Among these treatments are clot evacuation, continuous bladder irrigation, oral aminocaproic acid, oestrogens, endoscopic laser coagulation, intramural orpotein (free radical scavenger), alum irrigation, formalin, placental extract or prostaglandin administration, embolisation of iliac arteries, Helmstein's hydrostatic distension, hyperbaric oxygen, sodium pentosan polysulphate, silver nitrate, vasopressin, phenol, urinary diversion and cystectomy.

Alum irrigation for the treatment of haemorrhagic cystitis was first introduced by Floyd Csir to Ostroff and Chenault in 1982. Success rates are high with most reports placing rates at 75–100% (3–5). Alum is composed of either aluminium ammonium sulphate or aluminium potassium sulphate. As an astringent, aluminium acts by precipitating protein over bleeding surfaces. Its action is limited to the cell surface and interstitial spaces due to its low cell permeability. Hardening of the capillary endothelium occurs leading to decreased capillary permeability, contraction of intercellular space and vasoconstriction. As a result, local oedema, inflammation and exudation are also reduced.

There are two protocols for 1% alum irrigation. The first is to dissolve 400 g of potash of alum (McCarthy's) in 4 L of hot, sterile water. 300 mL of this stock solution is added to 3 L of 0.9% saline through a sterilizing filter and the bladder irrigated with up to 30 L of this solution in 24 hours. The second method is to dissolve 50 g of alum in 5 L of sterile water and irrigate the bladder at 250–300 mL/h (5). Schootstra et al. used 0.5% alum by dissolving 300 g of alum (aluminium potassium sulphate) and 480 g of sodium chloride in 60 L of water, with the advantages of decreased

aluminium toxicity and minimisation of colloid-like precipitation that can block the catheter (6).

The advantage of alum irrigation compared to other treatment methods for haemorrhagic cystitis is that it is generally safe, effective, well tolerated and cost effective. There is no need for regional or general anaesthesia unlike when using formalin, phenol, silver nitrate or hydrostatic bladder distension. It is a simple procedure that does not require open surgery or elaborate radiological procedures. In addition, local tissue histology is not distorted. The side effects of 1 % alum irrigation include suprapubic pain and bladder spasms. These side effects may be due to the fact that a 1% alum solution has a concentration of 1.05 g/L and a pH of 4.5. Normally, serum aluminium is excreted rapidly by the kidneys, with a potential excretion reserve of up to 30 times normal values. Renal insufficiency, accumulative absorption or massive absorption due to large absorptive surfaces, like a large bladder tumour, may cause aluminium toxicity. Aluminium toxicity causes neurofibrillary degeneration in the central nervous system which can lead to encephalopathy, malaise, speech disorders, dementia, convulsions and vomiting. It can also cause severe allergic reaction in susceptible individuals.

In summary, alum irrigation is a simple, safe, effective and well-tolerated, non-invasive option for the treatment of haemorrhagic cystitis. However, vigilance is still needed to avoid aluminium toxicity.

Author's contributions

Conception and design, drafting of the article, provision of study materials or patients, collection and assembly of data: CCKH

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Administrative, technical or logistic support: ZZ

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