

Current use of aluminium potassium sulphate in the treatment of hemorrhagic cystitis: a descriptive study

Background

Hemorrhagic cystitis is a bladder inflammation that leads to macroscopic and microscopic hematuria, dysuria and clotting. It is considered a medical emergency.

It is frequently associated with:

- ❖ Cyclophosphamide, ifosfamide, busulfan, thiotepa treatment, among other drugs;
- ❖ Viral (adenovirus, BK and JC), bacterial (*E. coli*, *Klebsiella sp.*), parasitic or fungal infections;
- ❖ Radiotherapy treatment of bladder cancer (incidence of 2-47%), prostatic cancer (9-21%) and cervix cancer (3-6,7%), also called radic cystitis (1).

In case of severe bleeding, clot evacuation and saline or water irrigation will be needed. In case of persistent hematuria, instillation of substances like aluminium potassium sulphate (alum), aminocaproic acid, 1% silver nitrate or aqueous solution of formaldehyde should be used.

Alum acts as an astringent, leading to protein precipitation, decreased capillary permeability, vasoconstriction and decreased edema (2). It is a compounded drug, which means that it is unmonitored by pharmaceutical industry. Therefore, the main objective of this work is to gather relevant information lacking in other published articles.

Purpose

- Characterization of patients who were treated with alum;
- Evaluation of the number of treatment days;
- Data collection of treatment tolerability, adjuvant medication and possible causes for early treatment suspension.

Material and Methods

A descriptive, observational and transversal study was carried out in one of Portugal's major hospital centers, Centro Hospitalar Lisboa Norte, EPE.

Data was collected from November/2012 to September/2013 from medical prescriptions and medical and nursing teams' interviews.

The patients included were all under medically prescribed treatment with alum.

The aqueous solution of 1% alum was prepared by the Pharmaceutical Services of Hospital de Santa Maria, using raw material, in a horizontal laminar flow hood (Diagram 1). The materials used and the total cost of this preparation are discriminated on table 1.

The alum solution was administered through bladder infusion at a recommended rate of 100ml/hour infusion.

Diagram 1 - Preparation of aqueous solution of alum 1%.

- 1- Weigh 32g of aluminium potassium sulphate dodecahydrate.
- 2- Dissolve the weighted mass in purified water previously heated to 80°C. Dilute to 320mL. An aqueous solution of 10% alum is obtained.
- 3- In the horizontal laminar flow hood, remove 300ml of a 3L 0,9% sodium chloride for irrigation bag and waste.
- 4- Through a 0,2µm filter add 300ml of the solution obtained in 2) to the sodium chloride bag.
- 5- Pack and properly label the final product.

Table 1 – Required material to prepare alum solution 1% and cost.

Material	Quantity	Total costs: 12,65€
Sterilized water (500mL)	1	
Sodium Chloride 0,9% irrigation solution (3L)	1	
Aluminium potassium sulphate dodecahydrate	32g	
Luer-lock 50cc syringes	12	
Luer cap	6	
Hypodermic needle 18GX1 ½ (1,20X40mm)	6	
Filter 0,2 µm	1	

Results

Data was collected from 9 patients, eight males and one female. Their main characteristics are described in table 2.

The therapeutic indication of alum in all studied patients was radic cystitis. The number of treatment days varied between 1 and 5, with a medium value of 2,25. Three of the patients repeated treatment with alum in different months by distinct episodes of hemorrhagic cystitis.

It wasn't reported any treatment failure, although in patient no. 7 was referred the formation of several clots which lead to treatment suspension by doctor's decision.

During alum instillation, butylscopolamine was administered to patients 1 and 2, and oxybutynin was administered to patients 3 and 6. This drugs were used to control bladder spasms resulting from alum administration and urine acidification. Suprapubic pain was reported in three patients, although it was easily managed with analgesics.

Patients 1, 4, 6 and 9 underwent concomitant therapy with oral or injectable aminocaproic acid.

The rate of alum's administration was as previously described. Nevertheless, in some patients, the infusion rate was reduced in order to optimize the therapy's tolerability.

Table 2 - Data of patients included in the study.

Patient number	Sex	Age	Diagnosis	Therapeutical Indication	No. treatment days
1	M	65	prostatic cancer	Radic cystitis	1+1
2	M	69	Bladder cancer		1+3
3	M	83	prostatic and bladder cancer		1
4	M	76	Bladder cancer		1
5	M	70	prostatic cancer		1+5+5
6	M	77	prostatic cancer		4
7	M	66	Rectal cancer		1
8	F	88	Bladder cancer		3
9	M	79	prostatic cancer		4
Average		≈74			≈2

Conclusions

- ✓ The alum therapy revealed itself as effective in managing hemorrhagic cystitis, economic and well-tolerated without general or epidural anesthesia, open surgery or radiological procedures.
- ✓ There was an expectable variability in the treatment duration in every patient since it depends directly with the evolution of its health status.
- ✓ As concomitant therapy, it was administered butylscopolamine in 2 patients; oxybutynin in 2 and aminocaproic acid in 3.
- ✓ The solution's preparation is simple and feasible by the Pharmaceutical Services.
- ✓ Despite the fact that in our hospitals the therapeutic use of alum is mainly in adults and in oncologic etiology only, some authors refer its use in pediatrics and cystitis of other etiologic factors (3).
- ✓ Determining serum aluminium can and should be encouraged to avoid possible toxicity, especially in prolonged treatments.

Bibliography

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No conflict of interest.