

Acute renal failure in the setting of “low-risk” therapy for mesothelioma

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Introduction

Chemotherapy for malignancy is fraught with potential side effects and complications. In choosing a chemotherapy regimen, the physician and patient must consider the risks, benefits, and individual patient goals. Some patients seek the services of integrative medicine which offers alternative therapies, such as high dose Vitamin C for malignant mesothelioma, but these too are not without risk.

Case Presentation

A 77 year-old male with a history of asbestos exposure and malignant mesothelioma was transferred from an outside hospital after presenting with pleuritic pain and acute on chronic renal failure with a creatinine of 10.01.

- Mesothelioma was diagnosed one year prior. At diagnosis, he declined aggressive chemotherapy due to risk of toxicity and opted for high dose Vitamin C infusion with nutritional therapy.

- The patient was critically ill on presentation with a severe anion gap metabolic acidosis with underlying metabolic alkalosis. His creatinine was 10.01 (baseline one month prior 1.97) and BUN was 104.

- The etiology of the patient’s acute onset of renal failure was initially unclear, and a diagnostic workup ensued.

- Urine electrolyte analysis was consistent with an intrinsic pathology.

- Microscopic evaluation revealed oxalate crystals (example shown in Figure 1).

- Ultrasound with bilateral calculi and increased echogenicity was consistent with oxalate deposition. (Figure 2)

- These findings were consistent with high dose Vitamin C toxicity as no alternative ingestion causing oxalate crystals was identified.

- Unfortunately, his clinical situation deteriorated over the hospital course. A CT of the chest revealed progressive mesothelioma, and his renal failure was irreversible. Hypoxic respiratory failure secondary to hypervolemia resulted. The patient declined dialysis and switched his goals to pure palliation.

Oxalate Crystals

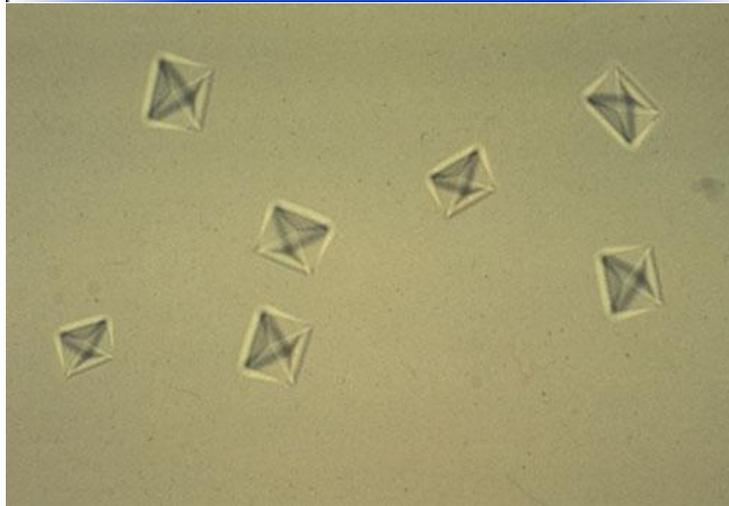


Figure 1: Example of rhomboid-shaped oxalate crystals as found in this patient.

Renal Ultrasound



Figure 2: Right renal US with calculi (marked by circle) and increased renal cortical echogenicity.

Discussion

- High dose Vitamin C therapy has been studied in the treatment of multiple disease processes, including advanced malignancies.
- Vitamin C has been shown to increase host resistance through boosted immunity.
- The clinical benefit of high dose Vitamin C in malignancy is mixed.
- Active clinical trials are ongoing including a weekly 50 gram Vitamin C infusion study in which our patient was enrolled.
- Although nutritional therapies are seemingly less toxic than traditional chemotherapy options, they are not without risks.
- High dose Vitamin C has been shown to induce calcium oxalate stone formation resulting in hyperoxaluria.
- The mechanism of action is a conversion of ascorbate to oxalate leading to hyperoxaluria.
- The use of Vitamin C in dialysis patients is controversial.
- Hyperoxaluria has been demonstrated at doses of 1-2 grams of Vitamin C daily.

Conclusion

Although this therapy is generally well tolerated, caution should be taken when using high dose Vitamin C in patients with renal failure as toxicity from oxalate deposition is more likely to occur. In combination with the findings of the previous case report, this case produces further evidence that oxalate deposition is a potential adverse effect that can have detrimental outcomes.

References

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- 7) Figure 1: Oxalate crystals. <http://panji1102.blogspot.com/2009/11/urinalysis-crystals-cast.html>