

Is Shockwave Lithotripsy Feasible for Treating Kidney Stones in Pediatric Mastocytosis Patients?

Almeida RP,^{1*} Mário Sá L,³ Chaim EA,² Pedro RN^{1,4}

¹Urology Department of UNICAMP, Brazil

²Director of the AME-SBO UNICAMP, Brazil

³Anesthesiology Department AME-SBO UNICAMP, Brazil

⁴Lithotripsy Center Coordinator AME-SBO UNICAMP, Brazil

Abstract

Mastocytosis is a rare disease, there is no description of cases of SWL in children with this condition. Considering the risk of mast cell degranulation related to the stress of the anesthetic and surgical procedure in question, this report speaks in favor of its viability.

Case Report: A 4-year-old child with cutaneous mastocytosis underwent SWL under general anesthesia with successful procedure without triggering a mastocytosis crisis.

Discussion: Solving stones through SWL is feasible in children with mastocytosis as long as the risks are controlled by a multidisciplinary team (surgeon, anesthesiologist and collaborative team) minimizing the stress of the procedure.

Keywords: Mastocytosis, Anesthesia, LECO

Introduction

Pediatric Mastocytosis is a rare infirmity with estimate prevalence of one in 25-30.000.¹ It is characterized by the presence and accumulation of mast cells throughout the various organ systems, that when triggered by physical or emotional stress, launch histamine, prostaglandins, heparin and leukotriens into the blood stream, generating symptoms such as pruritus, diarrhea, cough, wheezing, flushing and fatigue. Mast cell degranulation can be intense (provoked or unprovoked) resulting in anaphylactic reaction.¹

There has been poor association between systemic mastocytosis and urolithiasis in the current literature; however it has been speculated that the bone resorption resulted from the heparin and prostaglandin produced by the mast cells, creates a increased load of calcium in urine.² Therefore, calcium supersaturates the urine and crystallizes into stones. Moreover, patients with systemic mastocytosis have increased risk of osteoporosis that, in turn, is treated with oral vitamin D and Calcium; which again may trigger crystallization of calcium salts in urine.²

Case Report

A 4-year-old boy has frequently needed emergency medical attention in Pediatric ER of the State University of Campinas Hospital, due to acute episodes of colicky pain in the right flank for the past couple of months. This patient is diagnosed with systemic mastocytosis and had undergone several hospital admissions for clinical management of mast cell degranulation prior to the present symptoms. Pain was poorly controlled with Dipirone, and mild hydration since anti-inflammatory, more potent analgesics or sedatives could not be administered safely, for their capacity of provoking anaphylaxis in this patient.

KUB x-ray showed a 1,5 cm stone located in the topography of the right renal pelvis, confirmed by a renal ultrasound scan which also demonstrated a moderate dilation. Consequently, the definitive treatment for the renal stone was immediately sought. The major concerns were the anesthetic potential hazard and the physical stress from the surgical procedure, both putting the mastocytosis patients at a high risk of anaphylactic-like reaction.³⁻⁶ After a thorough discussion with an expert team of anesthesiologists it

Quick Response Code:



*Corresponding author: Rua Padre Almeida, 310 Cambuí, Campinas/SP 13025-250, Brazil

Received: 16 December, 2024

Published: 03 January, 2025

Citation: Almeida RP, Mário Sá L, Chaim EA, Pedro RN. Is Shockwave Lithotripsy Feasible for Treating Kidney Stones in Pediatric Mastocytosis Patients?: Case Report. *Trends Uro Nephro Res.* 2025;4(1):1-3. DOI: [10.53902/TUNR.2025.04.000516](https://doi.org/10.53902/TUNR.2025.04.000516)

was decided to perform a shockwave lithotripsy under general gas anesthesia. SWL was chosen due to its high success rates in children and for its non-invasive characteristics. SWL is the first treatment option for kidney stones <2 cm and also is associated with less auxiliary procedures which would increase risks in the present case scenario.⁷

The 4-year-old patient was brought to the OR, carefully laid on the surgical table where his vitals were well monitored, then he was offered a mask with sevoflurane Figure 1. Shortly after he fell asleep; the anesthesiologist then got an IV line in his left arm. Initial patient positioning was performed under fluoroscopy and ultrasound guidance (Siemens G20). An expert urologist (R.N.P.) performed Shockwave lithotripsy with Siemens® MODULARIS Vario®, using the following settings: coupling pressure on 4, maximum energy of 1.2 J, medium energy of 0.9 J. One thousand and seven hundred shocks were deployed at a rate of 60 shocks per

minute, and the energy was slowly increased every 200-250 shocks towards the minimum needed to break the stone, taking extra care not to exceed the energy limit for a 4 year-old boy.

The intraoperative success was evaluated with the real time ultrasound, lowering significantly the x-ray emission rate and consequently its hazards. Sporadically and in the end of the procedure x-ray images of the calculus were taken for a better appreciation of stone fragmentation Figure 2.

The patient tolerated well the procedure which was uneventful. The recovery was fast, and the boy was sent to the ICU for post-operative observation. He was discharged from the Hospital 24 hours after the procedure. Soon after the discharge, stones fragments were seen in voided urine and some were sent for biochemical analysis which showed calcium and oxalate components. Two and 4-week follow up KUB and Ultrasound showed no signals of calculi.



Figure 1: Anesthesia with Sevoflurane, note the skin maculas characteristic of pediatric mastocytosis. Patient positioning on the SWL table was done right after anesthesia induction

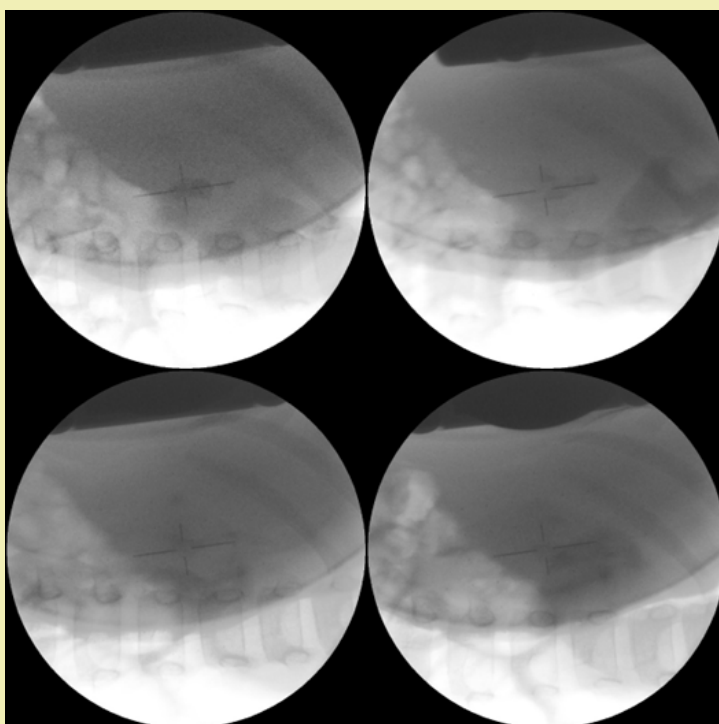


Figure 2: Fluoroscopic images showing stone fragmentation during SWL

Discussion

Pediatric mastocytosis is a rare life-threatening disease. To date no reports have been published on active treatment for urolithiasis in these group of patients.

Although the prevalence of kidney stones in patients with systemic mastocytosis is unknown, there is a possible association between mastocytosis and urinary tract stones as discussed by Gehard² for this reason, one should keep in mind that the definitive treatment shall never be delayed, given the lack of options of efficient analgesic drugs for pain control in an acute scenario. Hereby, we report the means for a safe SWL in a 4 year-old boy with pediatric mastocytosis. We emphasize the importance of having a strong and synchronized anesthesiologist-surgeon interaction in the quest of a successful procedure. It is important to note that a close clinical and nutritional follow-up is advised for these population to prevent urolithiasis.

Acknowledgements

None.

Funding

This Case Report received no external funding.

Conflict of Interest

Regarding the publication of this article, the authors declare that they have no conflicts of interest.

References

1. Johnson MR, Verstovsek S, Jorgensen JL, et al. Utility of the World Health Organization classification criteria for the diagnosis of systemic mastocytosis in bone marrow. *Mod Pathol*. 2009;22(1):50-57.
2. Molderings GJ, Solleder G, Kolck UW, et al. Ureteral stones due to systemic mastocytosis: diagnostic and therapeutic characteristics. *Urol Res*. 2009;37(4):227-229.
3. Ahmad N, Evans P, Thomas LRA. Department of Anaesthesia, London, UK. Review article Anesthesia in children with mastocytosis-A case based review. *Pediatric Anesthesia*. 2009;19:97-107.
4. Vaughan ST, Jones GN. Systemic mastocytosis presenting as profound cardiovascular collapse during anaesthesia. *Anaesthesia*. 1998;53(8):804-807.
5. Desborough JP, Taylor I, Hattersley A, et al. Massive histamine release in a patient with systemic mastocytosis. *Br J Anaesth*. 1990;65(6):833-836.
6. Carter MC, Uzzaman A, Scott LM, et al. Pediatric mastocytosis: routine anesthetic management for a complex disease. *Anesth Analg*. 2008;107(2):422-427.
7. EAU Guidelines. Edn. presented at the EAU Annual Congress Paris 2024. ISBN 978-94-92671-23-3.