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CASE REPORT

Jackstone calculus - a case report of a rare entity in a university hospital in Brazil

Cálculo de Jackstone - relato de caso de um achado raro em um hospital universitário no Brasil

Isabela Barroso Assuf[1], Giovanna Tolentino Brauns[2], Isabela Carim Fontoura[1], Clara Sarquis Rodrigues[3], Gabriela Neves de Alencar[1], Valentina Amorim Mendes[1], Lucas Carraro Serra Gomes[1], Gustavo Ventura Solano Torres[2], José Ronyeryson dos Santos Evangelista[2], Katia Gleicielly Frigotto*[4]

ABSTRACT

Introduction: The Jackstone Calculus is an uncommon type of urinary tract stone, with few cases reported in the literature and, so far, no cases recorded in Brazil. The calculus is named for its resemblance to a child's toy called "Jacks". **Case Report**: We report a rare case of an 84-year-old male patient with a previous diagnosis of human immunodeficiency virus who was admitted to the medical service to investigate the cervical mass. There was no history of urinary symptoms, previous urinary tract surgeries or invasive procedures. A computed tomography (CT) scan of the abdomen and pelvis performed upon admission to screen for other possible masses or lesions revealed prostatic hyperplasia and a single spiculated calcification in the bladder that resembled a toy jack. In this case, the bladder outflow obstruction due to benign prostatic enlargement is the likely cause of this stone. No treatment was carried out regarding the calculi, because the patient had another serious condition that was more important to be treated, and he also did not present symptoms of the vesical calculi. **Conclusion**: Jackstone's stone is a rare urological condition. The present case report agrees with others described in the literature, generally affecting older patients and often associated with primary obstructive causes. Physicians must recognize its typical appearance on radiological examinations, allowing for quick and effective treatment, when indicated. Our case contributes to the increasing evidence into this rare urological condition.

Keywords: Vesical calculi; Bladder calculus; Case report.

[1] Faculdade Souza Marques, Rio de Janeiro, Brazil.

[2] Universidade do Grande Rio Professor José de Souza Herdy (Unigranrio), Rio de Janeiro, Brazil.

[3] Universidade Estácio de Sá (Unesa), Rio de Janeiro, Brazil.

[4] Departamento de Clínica Médica, Universidade Federal do Estado do Rio de Janeiro (Unirio), Rio de Janeiro, Brazil.

Editor-in-charge:

Claudemiro Quireze Jr.

Hospital das Clínicas da Universidade Federal de Goiás.

Goiânia/GO, Brazil.

Corresponding author:

Katia Gleicielly Frigotto

Clínica Médica, Universidade Federal do Estado do Rio de Janeiro (Unirio), Rio de Janeiro, Rio de Janeiro.

E-mail: katiafrigotto@hotmail.com

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RESUMO

Introdução: O cálculo de *Jackstone* é um tipo raro de cálculo do trato urinário, com poucos casos relatados na literatura e, até o momento, nenhum caso registrado no Brasil. Esse cálculo recebe esse nome por sua semelhança com um brinquedo infantil chamado "*Jacks*". **Relato de Caso:** Paciente masculino de 84 anos, com diagnóstico prévio de vírus da imunodeficiência humana, que foi admitido no serviço médico para investigação de uma massa cervical. Não havia história de sintomas urinários, cirurgias anteriores no trato urinário ou procedimentos invasivos. Uma tomografia computadorizada (TC) do abdome e pelve realizada na admissão para rastrear outras possíveis massas ou lesões, revelou hiperplasia prostática e uma única calcificação espiculada na bexiga. Neste caso, a obstrução do fluxo vesical devido ao aumento benigno da próstata é a causa provável do cálculo. Nenhum tratamento foi realizado em relação ao cálculo, pois o paciente apresentava concomitantemente outra condição grave que era mais importante de ser tratada naquele momento. **Conclusão:** O caso relatado tem características semelhantes com outros descritos na literatura, geralmente afetando pacientes mais velhos e frequentemente associados a causas obstrutivas primárias. É importante reconhecer a aparência típica do cálculo de *Jackstone* em exames radiológicos, para um tratamento rápido e eficaz, quando indicado. Este relato de caso contribui para o aumento das evidências sobre esta rara condição urológica.

Palavras-chave: Cálculo vesical; Cálculo de bexiga; Relato de caso.

Introduction

The jackstone calculus is an uncommon type of urinary tract stone, primarily found in the bladder and rarely in the upper urinary tract[1-3]. The calculus is named for resembling a child's toy called "Jacks"[1,4-8]. It has a spiky appearance, similar to thorns, with a dense central core and is mostly composed of dihydrate calcium oxalate[1-8].

Symeonidis et al. (2022)[9] conducted a systematic literature review and gathered 11 studies reporting on jackstone bladder calculi, with each yielding a different outcome depending on the individualization of each patient and their associated comorbidities. Patients with this condition had an average age of 73 (range: 55–84), with the majority (78.6%) having a single jackstone calculus[9]. Around half of the patients (42.9%) underwent concurrent bladder stone removal and prostate surgery, while approximately equal proportions (35.7%) underwent only open cystolithotomy[9].

We present a case in which a jackstone calculus was incidentally detected during an abdominal computed tomography (CT) scan, the first one reported in Brazil.

Case Report

An 84-year-old male patient, with a previous diagnosis of human immunodeficiency virus 20 years ago, undetectable viral load, and CD4 T lymphocytes 534 mm³, treated with lamivudine 300 mg per day and dolutegravir 50 mg per day, presented with asthenia and dysphagia when ingesting solids of 2 years duration, and a cervical mass in the right cervical region, which appeared 6 years ago and has grown progressively since then. There was no history of other symptoms such as dysuria, hesitancy, alteration in urine flow or frequency of micturition, hematuria, fever suggestive of urinary sepsis, acute or chronic retention of urine, urgency, nocturia, nocturnal enuresis or episodes of urinary incontinence or passage of calculi; no other urinary complaints were reported, and no previous urinary tract problems were known. There was no history of previous urinary tract surgeries or invasive procedures such as catheterization. The physical examination was a cervical mass measuring approximately 10 cm in diameter in the right cervical region, hardened, adhered to deep plans, with clear liquid coming out, extending to the supraclavicular region. There were no other alterations in the physical examination.

The patient was subsequently admitted to the medical service to undergo a biopsy to investigate the cervical mass that showed squamous cell carcinoma. Hematological, and biochemistry investigations did not reveal any abnormality, except for an alkaline phosphatase level of 259 U/L (reference range, 38–112 U/L). Laboratory values included normal serum blood urea nitrogen and creatinine levels, a serum calcium level of 9.4 mg/dL (reference range, 8.6–10.5 mg/dL), and a serum phosphorus level of 3.8 mg/dL (reference range, 2.7–4.7 mg/dL). The urinalysis was negative for leukocyte esterase, white blood cells and red blood cells.

A CT scan with the contrast of the abdomen and pelvis performed upon admission to screening for other possible masses or lesions revealed prostatic hyperplasia (about 57g) and a single spiculated calcification in the bladder, that resembled a toy jack, approximately 1.9x1.8cm (Figure 1).

During hospitalization, the patient developed pneumonia, which was treated with piperacillin and tazobactam. However, he developed septic shock and died approximately 19 days after admission.

Discussion

We present a rare case in which a jackstone calculus was incidentally detected during an abdominal CT scan. Only a few cases of jackstones had been reported previously in the literature[1,5,8], and none in Brazil.

Jackstone calculi have a characteristic shape that suggests the specific mineral content of these stones[1,3,6,7]. They are usually specific for calcium oxalate dihydrate stones, forming radiopaque stones that precipitate as monohydrate or dihydrate crystals[1,3-6]. They tend to crystallize in a specific pattern which tends to be irregular and yellow[2-4]. The spiculated shape has been attributed to repetitive abrasions against the bladder wall, which keeps the crystalline layer free from obstructive apatite or adherent mucoprotein, thus allowing a continuous deposition of calcium oxalate primarily at the spikelike projections[8]. As a result, the calculus grows mainly at the distal tips, producing the irregular, spiculated jackstone shape[5].

Bladder outlet obstruction remains the most common cause of bladder calculi in adults[1,5,6]. The most common factors predisposing to bladder stone formation include prostatic disease, previous lower urinary tract surgery, metabolic abnormalities, intravesical foreign bodies, spinal cord injuries, and upper urinary tract calculi, most of which are not jackstones[1,5-7]. The presentation of vesical calculi varies from completely asymptomatic to symptoms of suprapubic pain, dysuria, hesitancy, intermittency, nocturia, frequency, and urinary retention[1,5]. CT is highly sensitive and specific in identifying these calculi[2].

In our patient, the bladder outflow obstruction due to benign prostatic disease is the likely cause[1,5]. An enlarged prostate probably restricts the calculus into its eccentric location and contributes to the growth of stones by causing stasis of urine [1,5].

Options for treatment include cystoscopy, percutaneous cystostomy, and open cystostomy with stone removal[2]. It is important to recognize the characteristic shape of the jackstones, as they are susceptible to lithotripsy[1,3,5,6,8], although they are typically found in the vesical bladder, limiting the efficacy of lithotripsy[2]. In our case, no treatment was carried out regarding the calculi, because the patient had another serious condition that was more important to be treated, which resulted in his death. He also did not present symptoms of the vesical calculi.

Conclusion

Jackstone calculus is a rare urological condition, with few cases reported in the literature and, so far, no cases recorded in Brazil. The present case report agrees with others described in the literature, generally affecting older patients and often associated with primary obstructive causes. Physicians must recognize its typical appearance on radiological examinations, allowing for quick and effective treatment. There are several therapeutic options available, but eliminating the underlying cause remains the cornerstone of treatment. Our case contributes to the increasing evidence and offers valuable insights into this rare urological condition.

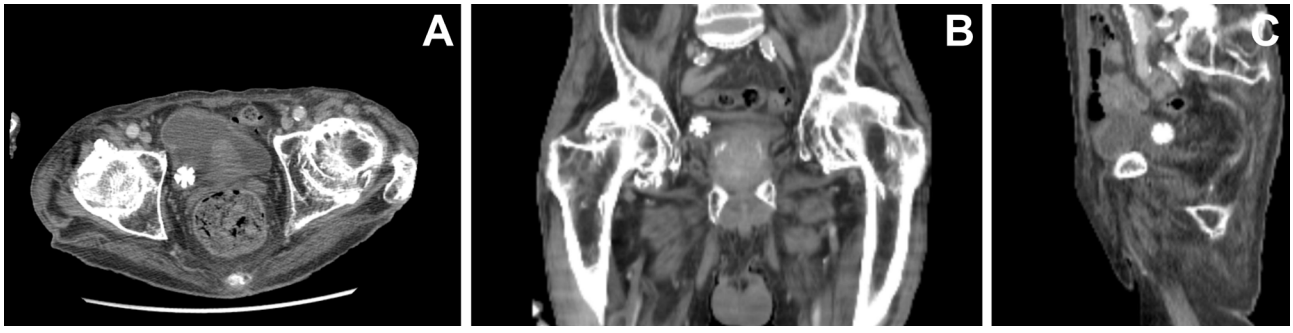

Figure 1. A. CT abdomen and pelvis showing the jackstone calculus in the bladder; Axial section; **B.** Coronal section; **C.** Sagittal section.

Author's Contribution:

We describe contributions to the papers using the taxanomy (CRediT) provide above:

Conceptualization, Investigation, Methodology, Visualization & Writing – review & editing: IBA; GTB; ICF; CSR; GNA. *Project administration, Supervision & Writing – original draft*: VAM; LCSG; GVST; JRSE; KGF.

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