

**Artículo original****Candida albicans vesical fungal ball in a neonate**

Oscar Vázquez-Tsuji MD,\* María Antonieta Mora-Tiscareño MD,\*\* Teresita Campos-Rivera MD,\* Ana Lilia Gómez-Solano MD,\* Ignacio Martínez-Barbabosa MD\*\*\*

**Resumen**

En los casos de candidiasis sistémica, la afección renal se presenta en el 85% de los pacientes, con una amplia gama de manifestaciones que van desde pielonefritis, hasta la formación de bolas fúngicas en la localización más frecuente a nivel de la unión ureteropélvica; en este caso el cuadro clínico es de carácter obstructivo. Se informa el caso de un recién nacido con sepsis, con bolas fúngicas de localización renal; presentó al mismo tiempo una bola fúngica en el piso de la vejiga. Las bolas fúngicas a nivel vesical son infrecuentes. El caso que se presenta es el tercero en la literatura mundial en neonatos y el duodécimo en la población general. Aunque existen varios esquemas terapéuticos, desde quirúrgico, hasta irrigación local con antimicóticos, en este caso se administró fluconazol por 47 días; desaparecieron las bolas fúngicas renales y la vesical. Se sugiere buscar intencionadamente bolas fúngicas con ultrasonido en pacientes con factores de riesgo de adquirir candidiasis sistémica, candiduria o en presencia de seudomicelios en orina.

**Palabras clave:** Bolas fúngicas renales, bola fúngica vesical, infección urinaria, fluconazol, anfotericina B, sepsis.

**Introduction**

The kidney is one of the most vulnerable organs to the pathogen action of fungi in patients with systemic candidiasis which causes renal involvement in 85 per cent of the cases<sup>1,2</sup>. Parenchymal renal invasion results in a variety of complications: pyelonephritis, papillary necrosis, perinephritic abscess, renal calculi, ureterocele, hydronephrosis, mycotic obstructive intrarenal masses, i.e., fungal balls frequently located at the ureteropelvic union<sup>1-3</sup>. The clinical presentation is dependent on the degree of obstruction. The most severe cases present with urinary

**Abstract**

In systemic candidiasis renal involvement occurs in 85 per cent of the patients. A wide variety of manifestations may take place including pyelonephritis and the formation of fungal balls, most commonly at the ureteropelvic union which cause obstruction. We report the case of a newborn who developed sepsis and a vesical fungal ball, a very unusual location. This is the third case in the world literature of a neonate with this condition, and the twelfth in the general population. Several treatments have been proposed for this condition: surgical excision, local irrigation with antimycotics and others. Our patient was treated with fluconazole for 47 days whereupon the renal and vesical fungus ball disappeared. We propose that renal fungal balls should be purposely investigated with ultrasound studies in patients at risk to develop systemic candidiasis, candiduria or those exhibiting pseudomycelia in the urine.

**Key words:** Renal fungal balls, vesical fungal ball, urinary infection, fluconazole, amphotericin B, sepsis.

retention, oliguria or anuria<sup>4</sup>. A delayed diagnosis of renal candidiasis may result in lesions and severe complications. Therefore it is most important to diagnose the problem in patients suspected of having this condition<sup>5,6</sup>.

Surgical treatment had been the standard approach for this condition; however recent reports indicate the successful use of systemic antimycotics such as fluconazole and amphotericin B<sup>7</sup>. The purpose of this paper is to present the case of a neonate with renal fungal balls who developed the clinical picture of a vesical fungal ball.

**Case report**

The patient was a one month old female born in the state of Mexico (Mexico) from a 19 year old mother's first pregnancy. There was no antenatal control. The child was born on the eighth month following a premature membrane rupture. She weighed 2,700 grams; breathed and cried spontaneously at birth. Apgar was not known. BCG and Sabin vaccines were given. Twenty four hours after birth jaundice was noted and a navel purulent secretion was detected. An unknown

\* Department of Parasitology and Mycology.

\*\* Department of Radiology.

Instituto Nacional de Pediatría. (National Institute of Pediatrics)

\*\*\* Universidad Autónoma Metropolitana. Xochimilco

Corresponding author: Oscar Vázquez-Tsuji MD. Department of Parasitology and Mycology. Instituto Nacional de Pediatría. Insurgentes Sur 3700-C. Col. Insurgentes Cuicuilco. México 04530 D.F. e-mail: [raulmdc@hotmail.com](mailto:raulmdc@hotmail.com)

Recibido: julio, 2002. Aceptado: agosto, 2002.

amount of ampicillin was given. At six days of age, because of lack of appetite she was hospitalized and subjected to exsanguino-transfusion and plasma venous infusion. A cardiorespiratory arrest took place which necessitated cardiopulmonary resuscitation and mechanical ventilation. *Klebsiella pneumoniae* sepsis was diagnosed and the child was referred to our Institute on October 5, 2001. On examination this one month old patient appeared septic, unresponsive, jaundiced. No cardiorespiratory signs were detected. Bowel peristalsis was present. The liver was enlarged. A catheter had been placed in the left lower extremity; a Foley catheter and a nasogastric sound had been implanted. A protracted cholestatic syndrome and neonatal sepsis were diagnosed. Blood cultures, urinalysis and metabolic screening test were done. Marked urine aminoaciduria was reported.

The next day the child weighed 2,100 grams. Heart rate was 140/min; respiratory rate, 38/min; afebrile, hypoactive, poor general condition. The liver was more enlarged; jaundice had increased; the neck was overextended; the anterior fontanelle was normotensive; muscular mass was diminished; the spleen was palpable. On October, 9 acholia was diagnosed. Laboratory findings: hemoglobin, 9.5 g/dL; wbc, 27,000; segmented neutrophils, 71%; platelets, 284,000; total bilirubin, 19.3; direct bilirubin, 14; glutamic oxalacetic transaminase, 971%; glutamic pyruvic transaminase, 387. Blood culture for bacteriae and fungi, centrifuged urine direct examination, urine culture for fungi and serum antigen detection for *Candida* by monoclonal antibodies tests were done. Treatment was started with cephriaxone and dicloxacillin.

Direct examination of centrifuged urine showed the presence of *Candida sp.* pseudomycelia and blastoconidia. On October 11 serial blood cultures for fungi and renal ultrasound were performed. The patient was febrile. Treatment with fluconazole was started at the dose of 10 mg/kg/day in addition to the antibiotics. An antigen detection serum test for *Candida* was negative.

The patient became stable. A urine culture (October 12) was positive for *Candida albicans* with over 100,000 UFC/mL. Cephtriaxone and dicloxacillin were discontinued. On October 16 the patient developed intestinal ischemic disease. Marked edema of the neck and eyelids appeared. There was hypoventilation, costal retraction and nasal flaring, abdominal distention and reduced peristalsis. On October 17 an ultrasound showed a right kidney measuring 5.5 x 2.3 x 2.3

cm with marked echogenicity and hyperechogenic round patterns which did not project a posterior sonic shadow beyond the level of the caliceal systems nor the pelvis; the renal contour was normal. The left kidney measured 5.2 x 2.1 x 2.8 cm. It exhibited marked echogenicity and rounded hyperechogenic patterns which did not project a posterior shadow at the caliceal nor the pelvic level. The bottom wall of the bladder showed a hyperechogenic oval-shaped mass which did not project a shadow; it measured 7 x 3 mm; it was consistent with a fungal ball (Figures 1, 2).



**Figure 1.** Renal sonogram which shows fungal balls in the collectors without the projection of a sonic shadow.



**Figure 2.** Vesical sonogram which shows the presence of an oblong shape fungal ball in the bottom wall of the bladder.

The patient developed pneumonia and cephalexin was started at 150 mg/kg/day divided in three doses and clyndamycin, 40 mg/kg/day divided in four doses. Blood and urine cultures were repeated.

On October 27 the patient was in poor condition. Severe anemia required a blood transfusion, 4 mL/kg in three hours; a new transfusion of 10 mL/kg in three hours was required. Urine culture were negative. Antibiotics were discontinued in November 9 after 21 days, fluconazole was kept up. Renal fungus balls were still present by November 12, some of which gave a sonic shadow; the largest fungal ball was located in the lower wall of the bladder. It disappeared subsequently. There were still signs of pyelocaliceal dilatation. Treatment was continued for ten more days. Antimycotics were kept up for a total 57 days because of the poor response caused by the immunologic condition of the patient. A new ultrasound showed no renal fungal balls; pyelocaliceal dilatation persisted. Fluconazole was discontinued. One month later, direct examination of centrifuged urine and urine culture for fungi were negative. The last renal ultrasound only reported pyelocaliceal dilatation.

## Discussion

The diagnosis of *Candida* urinary infection has usually been approached with different criteria. Among the most reliable has been the UFC count of *Candida* in urine cultures. A *Candida* urinary infection is considered positive with counts >10,000 UFC/mL in urine obtained by catheterization. Most reports on *Candida* urinary infection base the diagnosis on the presence of blastoconidia (yeasts) and on the *Candida* count of UFC/mL in urine cultures. However the presence or absence of pseudomycelia in the urine has not been specifically investigated. It has only been documented when patients eliminate "fungal balls" in their urine, which seldom occurs. We believe that intentional search of pseudomycelia in the urine is most important based on the fact that in the pseudomycelial stage originated from blastoconidia the fungi avoid phagocytosis and are capable of invading the surrounding tissues; blastoconidia are the saprophytic form whereas the mycelial is the pathogen or parasitic form<sup>8-10</sup>.

In our patient we detected abundant blastoconidia and pseudomycelia elimination. The presence of abundant pseudomycelia and a count greater than 100,000 UFC/mL suggested that an invasive renal or vesical process was

present. Whereas the renal fungal balls had the typical shape and size described in numerous reports, the vesical fungal ball had an oblongue shape.

The reports on vesical balls indicate that their shape is amorphous. Microscopic examination shows their laminated structure resembling onion skin layers; they exhibit calcium and phosphate deposits<sup>11</sup>.

This is the third case in the literature of vesical fungal ball in a neonate<sup>12,13</sup>. This location is uncommon in other age groups; only nine such cases have been reported<sup>14-22</sup>.

There is no general agreement on the method of treatment. Several authors recommend a parenteral treatment in addition to intravesical irrigation with amphotericin B and the need for surgical removal of pelvicaliceal mycelia. Other authors advocate only the use of fluconazole or of amphotericin B; some of these treatments have been successful while others have had remissions or have failed altogether<sup>23</sup>.

The duration of antimycotic treatment has not been firmly established. In our opinion it should be continued until direct examination of centrifuged urine and blood cultures are negative for fungi in the presence of *Candida* sepsis associated with a renal infection; in addition, the renal ultrasound must be negative for the presence of fungal balls with reappearance of normal echogenicity of the renal parenchyma<sup>24,25</sup>.

We propose that the diagnostic approach in cases with *Candida* urinary tract infection should include a renal ultrasound study in every patient with systemic candidiasis, with candiduria and over 10,000 UFC/mL of *Candida sp.* and in cases with abundant pseudomycelia in the urine<sup>25</sup>.

## REFERENCES

1. Daale H, Narvawar RS, Rathod K. Renal fungal ball: An unusual sonographic finding. *J Clin Ultrasound* 2002;30:178-80
2. Lauter J, Reichman B, Graif M, Brish M. Anuria in a premature infant due to ureteropelvic fungal bezoars. *Eur J Pediatr* 1986;145:125-7
3. Bailey JE. Neonatal candidiasis: the current challenge. *Clin Perinatol* 1991;18:263-80
4. Eckstein CW, Kass EJ. Anuria in a newborn secondary to bilateral ureteropelvic fungus balls. *J Urol* 1982;127:109-10
5. Bryant K, Maxfield C, Rabalais G. Renal candidiasis in neonates with candiduria. *Pediatr Infect Dis J* 1999;18:959-63
6. Matsumoto AH, Dejter SW, Barth KH, Gibbons MD. Percutaneous nephrostomy drainage in the management of neonatal anuria secondary to renal candidiasis. *J Pediatr Surg* 1990;25:1295-7

7. Babut JM, Coeurdacier P, Bawab F, Treguier C, Fremond B. Urinary fungal bezoars in children. Report of two cases. *Eur J Pediatr Surg* 1995;5:248-52
8. Louria DB, Bryton RG. The behaviour of *Candida* cell within leucocytes. *Proc Soc Exp Biol Med* 1964;115:93-8
9. Montes L, Wolborn WH. Ultrastructural features of host-parasite relationship in oral candidiasis. *J Bacteriol* 1968;96:1349-56
10. Montes L, Wilborn WH. Fungus-host relationship in candidiasis. A brief review. *Arch Dermatol* 1955;121:119-24
11. Morton KM, Robertson AJ, McIntyre J. Urinary bladder fungus ball. *J Clin Pathol* 1988;41:1243-4 (letter)
12. Baetz-Greenwalt B, Debaz B, Kumar ML. Bladder fungus ball: a reversible cause of neonatal obstructive uropathy. *Pediatrics* 1988;81:826-9
13. Kumar M, Komiko M. Neonatal ultrasound casebook. Bladder fungus ball in disseminated candidiasis. *J Perinatol* 1990;10:320-1
14. Bergamini G, Di Mario M, Barbuti D, Cozza R. Diagnosi ecografica di cistite da *Candida albicans* in età pediatrica. *Minerva Pediatr* 1991;43:389-92
15. McDonald DF, Fagan CJ. Fungus ball in the urinary bladder. Case report. *AJR* 1972;114:753-7
16. Comiter CV, McDonald M, Minton J. Fungal bezoar and bladder rupture secondary to *Candida tropicalis*. *Urology* 1996;47:439-41
17. Gallego Gomez J, Momo Sanchis JA, Ferrando Marco F. A vesical fungus ball. Report of a case. *Acta Urol Esp* 1984;8:329-32
18. Harold DL, CoF SA, Kass EF. *Candida albicans* "fungus ball" in bladder. *Urology* 1977;9:662-3
19. Stening SG, Christie WJ. "Fungus ball" of the urinary bladder. *Med J Aust* 1972;1:372-3
20. Turner RW, Grigsby TH, Enright JR. Anuria secondary to mechanical obstruction caused by *Candida* fungus ball. *J Urol* 1973;109:938-40
21. Lefevre F, Renoult E, Hubert J. Bladder candidiasis after renal transplantation: contribution of ultrasonography. *J Radiol* 2000;81:457-9
22. Chisholm ER, Hutch TA. Fungus ball (*Candida albicans*) formation in the bladder. *J Urol* 1961;56:559-62
23. Hitchcock IRJ, Pallet A, Hall AM, Malone JSP. Urinary tract candidiasis in neonates and infants. *Br J Urol* 1995;76:252-6
24. Visser D, Monnens L, Feitz W, Semmekrot B. Fungal bezoars as a cause of renal insufficiency in neonates and infants-recommended treatment strategy. *Clin Nephrology* 1997;49:198-201
25. Vázquez TO, Campos RT, Ahumada MH, Martínez BI, Cardoso HG. Renal fungal balls in children. A study of nine cases. *Acta Pediatr Mex* 2002;23:68-72

## Instituto Nacional de Pediatría

### Programa de reuniones científicas para el último trimestre del año 2002

#### Departamento de Educación Médica Continua

##### OCTUBRE

#### III Curso de actualización en dolor y anestesiología pediátrica

1 al 4

**Sede:** Auditorio principal

**Profesores titulares:** Dr. Gabriel Mancera Elías, Dr. Andrés de la Rosa Mendoza

#### XXIV Reunión de actualización en pediatría

16 al 18

**Sede:** Auditorio principal y salas B y C

**Profesor titular:** Dr. Marte Hernández Porras

#### XI Reunión nacional de trabajo médico social

23 al 25

**Sede:** Auditorio principal

**Profesora titular:** TMS María del Carmen Aguilar Martínez

##### NOVIEMBRE

#### Taller de reanimación neonatal

4 y 5

**Sede:** Sala B.

**Profesor titular:** Dr. Carlos López Candiani

#### XV Congreso Nacional de Enfermería Pediátrica

6 al 8

**Sede:** Auditorio principal

**Profesoras titulares:** Enfra. Eva Isabel Sarabia Herrera, Lic. Isabel Gómez Miranda

#### Congreso de Cardiología para el Pediatra

27 al 29

**Sede:** Auditorio principal

**Profesor titular:** Héctor Osnaya Martínez