A Case Report of Schistosoma haematobium Infection detected on urine cytology

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***Abstract*: We report a case of urinary schistosomiasis detected on urine cytology. Cytopathological examination of urine samples is a routine, non- invasive diagnostic procedure used to detect diseases of the urinary tract including infection due to various causative agents as well as malignancy, predominantly bladder cancer. A 71 year-old male presented with decreased urine output and lower abdominal pain since one month. Cytology of the urine sample was carried out for three consecutive days.**

***Index Terms*: Schistosoma, urine cytology, parasitic infections, Bilharziasis**

INTRODUCTION

The genus Schistosoma contains different species which include *Schistosoma haematobium* (*S. haematobium*), *S. mansoni*, *S. japonicum*, *S. mekongi*, *S.intercalatum*, *S.malayensis*, and *S. guineensis*. The most significant of these is *Schistosoma haematobium* (bilharzia). *S. japonicam* is considered as the most pathogenic causing clinically presenting a range of symptoms from mild diarrhea, nausea, Katayama fever, portal hypertension, splenomegaly and ascites to liver cirrhosis and fibrosis.[1]This infection is endemic in countries of Africa and the Middle-east, however the migration of population from endemic zones has resulted in introduction of such cases in non-endemic developing countries.

The cytologic findings of urine suggestive of *Schistosoma haematobium* infection include identification of the ova, and squamous metaplastic cells or malignant cells if there is urinary bladder cancer associated with it. Inflammatory cells, hyperkeratosis and red blood cells can also be seen in the smears prepared from the urine samples. The squamous metaplastic cells could transform into malignant squamous cells in the future with persistence of *S. haematobium* which is known to be a potential biocarcinogen.

Parasitic infection due to this organism can lead to death due to serious complications, such as, hydronephrosis, renal insufficiency, granulomatous inflammation, irreversible fibrosis, , bladder carcinoma, and ulceration of the bladder or ureteral wall. [2].

CASE REPORT

A 71-year-old, male presented with lower abdominal pain and decreased urine output since 1 month. He was farmer by occupation and resident of Pen, Raigad district of Maharashtra. The haematological and biochemical investigations showed that blood cell parameters and indices showed eosinophilia.
On CECT, a large heterogenously enhancing soft tissue lesion measuring 3 x 2 x 2 cm was noted in the left pelvic region with no evidence of vascularity.

10 mL of slightly hazy, pale yellow urine was received for three consecutive days for urine cytology. On carrying out urine routine examination 3-4 pus cells/high power field, 2-4 red blood cells/high power field, 1-2 epithelial cells/high power field and eggs of *Schistosoma haematobium* were observed.

On cytology, May Grunwald- Giemsa stained smears showed numerous eggs of Schistosoma haematobium, few squamous epithelial cells, red blood cells and occasional lymphocytes. The egg of the parasite found appeared round to oval and spear shaped with a remarkable terminal spine at one end.

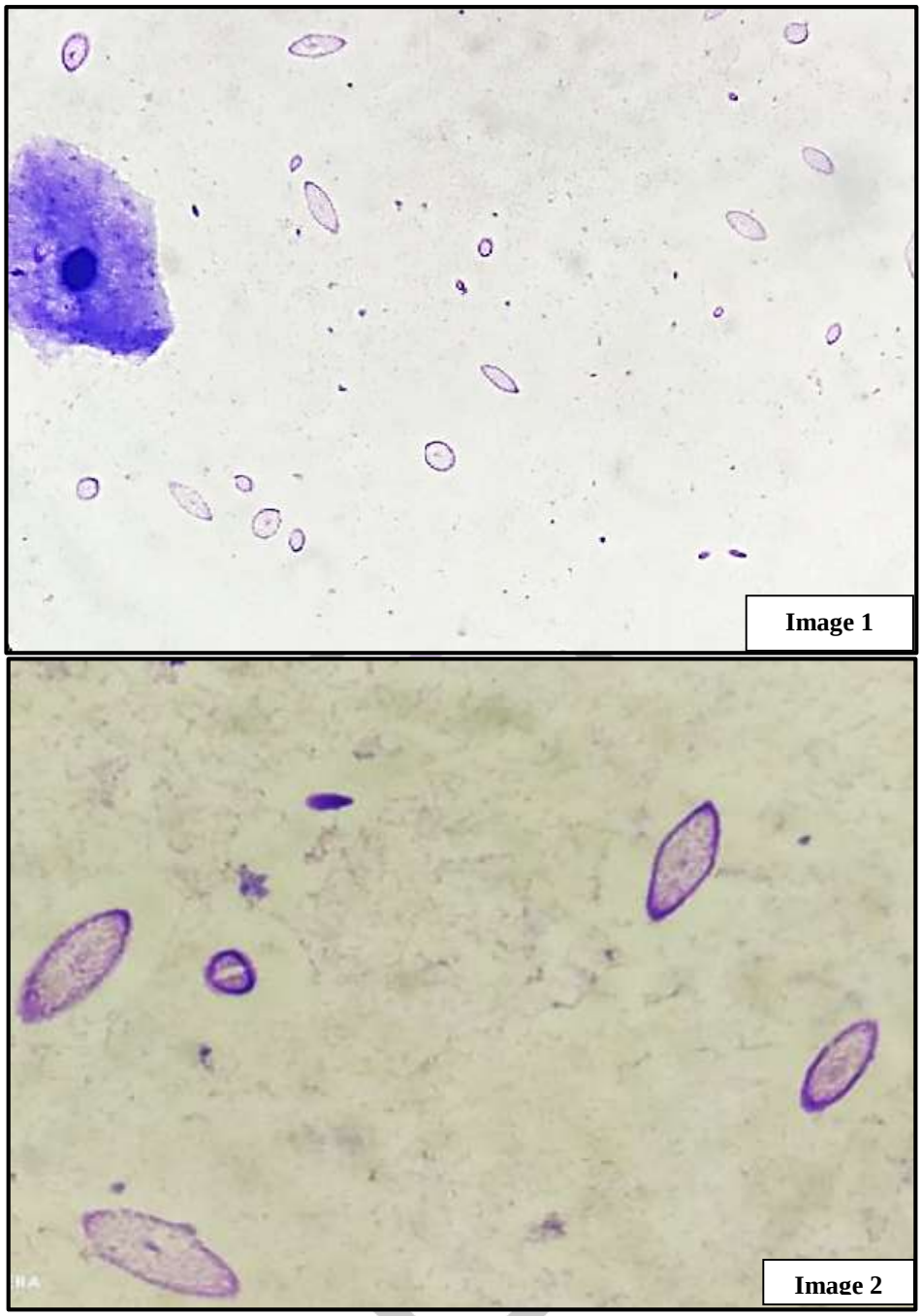

Image 1 and 2 (MGG stain, 10x and 40x magnification): Smears prepared from centrifuged urine sample show S. haematobium ova.

DISCUSSION

The World Health Organization reports Schistosomiasis to be one of the "most neglected diseases". The trematode flatworms of the genus *Schistosoma* cause Schistosomiasis in major tropical and subtropical countries of the world affecting over 200 million people worldwide and imposing significant health and economic burden on individuals and communities. [3]

The route of infection is through water contaminated with larval forms of the worm, or cercaria, released by certain freshwater that can penetrate the skin. Snails are intermediary hosts art of the parasite's lifecycle and which become infected by eggs released in human urine or faeces.

The ova of Schistosoma haematobium appear elongated and have a thick transparent capsule with a sword-shaped protrusion called as the terminal spine located at the one end. At times, calcified ova may also be noted in the urinary sediment. Miracidium is the embryonal form which is released in human stool and urine.

The Schistosoma worm and eggs which give rise to estrogen-like molecules along with their metabolites have been suggested to be potentially carcinogenic substances involved in schistosomiasis-associated cancers. [4]There is evidence of association with urinary bladder carcinoma and expression of markers such as cyclooxygenase-2 (COX-2) and inducible nitric oxide synthase (iNOS) in urinary schistosomiasis patients. [5]

S. Haematobium infection is known to cause damage with parasite eggs deposited at the affected sites. [6]The urinary bladder malignancy which are associated to schistosomiasis are primarily squamous cell type. Few cases revealing simultaneous presence of squamous cell bladder carcinomas along with transitional cell carcinoma have also been reported. [7]

The presence of squamous metaplastic cells too on cytology can be beneficial in suspecting early development of squamous cell bladder carcinomas in patients at risk. Squamous cell carcinoma of the bladder is reported as the most common cause of mortality by urinary schistosomiasis, especially in patients between 30 and 40 years old. [8]

Though haematuria is the most common presenting symptom in patients with Schistosomiasis, approximately 1.3% of patients with asymptomatic microscopic haematuria (3-4 red blood cells per high-power field) have been noted.[9]

The definitive method for diagnosis as well as species identification of schistosomiasis remains presence of parasitic eggs in the urine, stool or biopsy material. PCR techniques have also been introduced for confirmatory diagnosis and DNA detection for serum or urine is also developed.
Based on the clinical symptoms, the other differential diagnoses include urinary tuberculosis, renal or urinary bladder malignancies, acute glomerulonephritis and urinary stones.

Urinary schistosomiasis has a very low rate of prevalence in South-east Asian and South Asian countries. In India an endemic focus of urinary schistosomiasis was confirmed in Gimvi village of Ratnagiri district, Maharashtra, probably by a new schistosome species. As the eggs were oval shaped and were present in urine of patient, but as no species of Bulinus snail, the intermediate host of *S. haematobium*is existing in India, so a new schistosome species that is *Schistosoma gimvicum* name has been proposed. [10, 11, 12]

CONCLUSION

Cytopathological examination of urine is an important, non-invasive diagnostic screening tool for urinary tract ailments. It can also be used as a follow-up procedure for patients at high risk and those previously treated for bladder cancer.

Timely diagnosis of *S. haematobium*-infected individuals in urine samples on cytology plays an important role in reducing the severity of the disease, avoiding irreversible complications and sequels including the possible development of bladder cancer in later years, if early attention is not given. Follow up should be advised to check recurrence.

REFERENCES

[1] Bajracharya *et al., Access Microbiology* 2020;2DOI 10.1099/acmi.0.000117
[2] E. Hams, G. Aviello, and P. G. Fallon, "The schistosoma granuloma: friend or foe," *Frontiers in Immunology*, vol. 4, p. 89, 2013.
[3] Blas B.L., Lipayon I.L., Tormis, L.C., Portillo L.A., Hayashi M. and Matsuda H. (2006) *Southeast Asian Journal of Tropical Medicine and Public Health.* 37(1): 26-32.
[4] M. J. Gouveia, P. J. Brindley, L. L. Santos, J. M. Correia da Costa, P. Gomes, and N. Vale, "Mass spectrometry techniques in the survey of steroid metabolites as potential disease biomarkers: a review," *Metabolism*, vol. 62, no. 9, pp. 1206–1217, 2013.
[5] H. E. Hassan, A. A. B. Mohamed, A. O. Bakhiet, and H. G. Ahmed, "Immunohistochemical expression of COX2 and iNOS in bladder cancer and its association with urinary schistosomiasis among Sudanese patients," *Infect AgentCancer*, vol. 8, no. 9, 2013.
[6] K. C. Brouwer, P. D. Ndhlovu, Y. Wagatsuma, A. Munatsi, and C. J. Shiff, "Epidemiological assessment of *Schistosomahaematobium*-induced kidney and bladder pathology in rural Zimbabwe," *ActaTropica*, vol. 85, no. 3, pp. 339–347, 2003.
[7] S. Salem, R. E. Mitchell, A. El-Alim El-Dorey, J. A. Smith, and D. A. Barocas, "Successful control of schistosomiasis and the changing epidemiology of bladder cancer in Egypt," *BJU International*, vol. 107, no. 2, pp. 206–211, 2011.
[8] Julia FX, Pepio JM. Inmigracion en atencionprimaria.Cursoautoformativo en la atencionprimariade la salut. Barcelona: Institutd'estudis de la Salut. Generalitat de Cataluna; 2003; p. 51-5.
[9] M. C. Hall, S. S. Chang, G. Dalbagni et al., "Guideline for the management of non-muscle invasive bladder cancer (stages Ta, T1, and Tis): 2007 update," *Journal of Urology*, vol. 178, no. 6, pp. 2314–2330, 2007.
[10] Kali A. Schistosome infections: An Indian Perspective. Journal of Clinical and Diagnostic Research. 2015;9(Suppl 2):DE01-DE04.
[11] Agarwal MC, Rao VG. Indian Schistosomes: A need for further investigations. Journal of Parasitology Research. 2011;2011:250868,
[12] Wiwanitkit V. Overview of clinical reports on urinary schistosomiasis in the tropical Asia. Pakistan Journal of Medical Sciences. 2005; 21 (Suppl 4):499-501.