







# *Balantidium coli*; Rare and Accidental Finding in the Urine of Pregnant Woman: Case Report

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**Background:** *Balantidium coli* is a ciliated protozoan parasite, which causes intestinal and extraintestinal infections in humans. It is transmitted feco-orally by ingesting infective cysts with food and water. Urinary balantidiasis may occur through contamination (direct spread from the anal area), secondarily to rectovaginal fistula and following immune suppression. Data about cases of urinary balantidiasis are rare in the world. Currently, there are no documented reports of urinary balantidiasis in Ethiopia. As our understanding, there are only eleven documented reports of urinary balantidiasis globally. However, cases of urinary balantidiasis among pregnant women have not been documented yet. The aim of this report is to alarm health professionals for considering the occurrence of such rare cases and conduct diagnosis.

**Case Presentation:** A 24-year old pregnant woman was admitted due to severe preeclampsia and preterm delivery at Debre Tabor Comprehensive Specialized Hospital, gynecology ward. Her urine was presented to inpatient laboratory for routine urinalysis. We detected unusual and ciliated parasite from her urine sediment characterized by its active and rotary motility through its cilia and possessing macro- and micro-nuclei, several food vacuoles and ingested red blood cells inside the cytoplasm. Hematuria, many white blood cells and epithelial cells were also detected from the urine sediment, which suggests genito-urinary tract infection due to this parasite. This rare parasite finding was confirmed to be *B. coli*.

**Conclusion:** The route of transmission and extraintestinal existence from this woman's urine was unclear. It might be due to feco-oral transmission and spread to the genitourinary tract through direct anal contact. Moreover, it might be associated with immune suppression as she is pregnant woman.

**Keywords:** *Balantidium coli*, urine, pregnant, Ethiopia

## Background

*Balantidium coli* (*B. coli*) is the largest intestinal protozoan parasite found to infect gastrointestinal tract of humans. It is the only ciliated protozoan parasite that infects humans and other primates.<sup>1</sup> Although the infection occurring due to *B. coli* mostly remains asymptomatic, it may invade the intestinal mucosa and result in fatal balantidial dysentery (balantidiasis) resembling that of *E. histolytica*.<sup>1</sup>

*B. coli* infection encompasses worldwide distribution. However, the prevalence of the disease among humans is highly limited because of its asymptomatic nature in most cases. In humans, the infection is found mostly in areas of tropical and subtropical regions and developing countries; with poor environmental and sanitary conditions.<sup>2</sup> Evidences indicate that, the parasite is mainly endemic in Philippines, Papua New Guinea, Pacific Islands, Central and South America, and central Asia.<sup>2-5</sup>

The prevalence of *B. coli* in human hosts may vary from 0.02% to 1%.<sup>2,6,7</sup> These low frequencies may not represent the real occurrence and prevalence of the parasite as it usually remains asymptomatic and under reported. Higher prevalence of the infection among humans was reported from different regions including Latin America, the Philippines, Papua New Guinea, and the Middle East, with about 29% reports among pig farmers.<sup>2,5,8,9</sup> The main mode of transmission for *B. coli* is feco-oral route, usually occurring via ingestion of food and water contaminated with the cyst stage.<sup>2</sup> It has been postulated that

trophozoites might also be infective if ingested immediately within few hours after passage.<sup>10</sup> The disease is mainly zoonotic with pigs, rodents, wild boars, sheep, goats, camels and horses serving as reservoirs of the infection. Pigs and wild boars are considered to be the most important reservoirs.<sup>2,11–14</sup>

However, the parasite may cause extra intestinal infections especially in immune suppressed individuals through dissemination into appendix,<sup>15</sup> liver,<sup>16</sup> peritoneum,<sup>17</sup> lung,<sup>18</sup> and genitourinary tract.<sup>19</sup> In females, the genitourinary tract infections like uterine infection, vaginitis, and cystitis may occur through direct spread from the anal area and secondary to the rectovaginal fistula.<sup>20</sup> This paper reports rare, accidental and asymptomatic urinary balantidiasis from urine sediment of pregnant woman admitted in Debre Tabor Comprehensive Specialized Hospital, North West Ethiopia and requested for routine urinalysis.

## Case Report

A 24 years old pregnant woman was admitted in Debre Tabor Comprehensive Specialized Hospital gynecology ward due to severe preeclampsia and preterm delivery. She did not have signs and/or symptoms of balantidiasis. She had no history of smoking, drinking alcohol, and other underlying chronic diseases. However, her caregiver health professional sent urine sample for routine urinalysis test to the inpatient laboratory department.

The urine physically appeared to be somewhat dark and turbid with little foam. The chemical examination (Agape™ Urine Reagent Strips test kit) results revealed; Specific gravity of 1.01, pH=6.0, Albumin=1+, blood=3+ (hematuria), and Leucocyte=2+ (leucocyturia) which may be indicative of urinary tract infection (UTI). From the microscopic examination of centrifuged (3600RPM for 3 minutes) urine sediment, we found motile and ciliated parasite together with many white blood cells /high power field (HPF) and many epithelial cells/low power field (LPF). The processing of urine was conducted within five minutes after passage. The urine sediment repeated in the next morning revealed similar result.

The ciliated parasite appeared to be ovoid with rapid motility in circular fashion under the microscope slide. The entire body of the parasite was enclosed with short and uniform cilia which aided its motility. But, the cilia around the mouth appeared to be longer and clearly visible than the others. The parasite possessed the mouth part that was found at pointed anterior end (cytostome) and rounded posterior end (cytopyge). In addition, the body of the parasite contained several food vacuoles, macro- and micro-nuclei, and some red blood cells inside the cytoplasm. This parasite with unique morphological characteristics was confirmed by medical parasitologists and experienced microscopists jointly to be *B. coli*. We did not have gone to further staining of the parasite as we easily and correctly confirmed it with microscopy.

However, this was incidental and strange finding from the urine and it has never been detected here even from stool. The stool sample was collected from the patient. The stool physically appeared formed. But, it was found negative for the parasite. Finally, the finding was reported to the concerning health care giver for intervention and additional information was collected if she had contact with risk factors. But, she had no history of contact with pigs. She came from rural area where goats, sheep and other domestic animals are always in close contact with humans. She also had history of feeding raw vegetables. In addition, there are monkeys around the area which might have contaminated the vegetables she ingested.

## Discussion

Balantidiasis is zoonotic disease transmitted by ingestion of food and water contaminated with cyst stage (feco-oral). After ingestion, the cysts release the pathogenic trophozoites which live in the large intestine and reproduce by binary fission.<sup>1</sup> Many of the infected individuals may remain asymptomatic or few may develop different gastrointestinal symptoms. In some occasions, the trophozoites may disseminate to extraintestinal sites through blood circulation and metastasis through invasion and perforation of intestinal mucosa.<sup>21</sup>

This pregnant woman did not have history of contact with pigs. But, the risk factor for her case may be her usual close contact with domestic cattle<sup>22,23</sup> and her history of feeding raw vegetables which is one of the transmission mechanisms.<sup>24</sup> The parasite might have invaded urinary tract of this woman by direct spread through the anal area or metastasis via blood stream.<sup>21</sup> Hematuria and leucocyturia from her urine might have been due to *B. coli*.

**Table 1** Documented Case Reports of Urinary Balantidiasis

No	Case Reported from	Specimen	Year of Publication	References
1.	India	Urine	2007	[20]
2	Iran	Urine	2015	[21]
3.	Italy	Urine	2010	[25]
4.	Slovenia	Urine	2018	[26]
5.	Thailand	Urine	2020	[27]
6.	India	Urine	2016	[28]
7.	India	Urine	2013	[29]
8.	India	Urine	2014	[30]
9.	India	Urine	2014	[31]
10.	India	Urine	2017	[32]
11.	India	Urine	2017	[32]

**Note:** Data from these studies<sup>20,21,25–32</sup>.

Moreover, it has been estimated that immune suppression is among the important factors favouring the spread of urinary balantidiasis. Different reports have documented cases of urinary balantidiasis due to immune suppression following the underlying disease conditions.<sup>9,21</sup> Similarly, immunity declines during pregnancy. In addition to the above suggestions from her history, this pregnant woman might have acquired urinary balantidiasis due to her immune suppression. The stool sample collected from the patient, which appeared formed in consistency revealed negative result. She has history of dysentery three weeks ago and has taken treatments of amoebiasis.

*B. coli* in urine (urinary balantidiasis) is a rare finding. This is the first case report of urinary balantidiasis among pregnant women in Ethiopia and in the world. Currently, there are about eleven documented cases of urinary balantidiasis reported globally. Single cases reported from Iran,<sup>21</sup> Italy,<sup>25</sup> Slovenia<sup>26</sup> and Thailand<sup>27</sup> while, seven cases were reported from India (Table 1).<sup>20,28–32</sup>

## Conclusion

*B. coli* is ciliated protozoan parasite with worldwide distribution. It is transmitted feco-orally through ingestion of infective cysts with food and water. It invades the intestine and causes intestinal infection, mainly balantidial dysentery. It may also cause extraintestinal infections of liver, lung, peritoneum and genitourinary tract. Urinary infections occur through direct spread from the anal area and secondarily to rectovaginal fistula. In addition, the spread of urinary balantidiasis is associated with immune suppressed states like pregnancy. The parasite can be easily detected from urine sediment by light microscope through its characteristic ciliated and rapid rotary movement.

## Ethical Consideration

Approval letter for publication was obtained from Medical Laboratory Science department academic council (DAC).

## Consent for Publication

Written informed consent was obtained from the patient for publication of this case report.

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## Disclosure

The authors report no conflicts of interest in this work.

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