ENTEROCOCCUS FAECALIS GENERATED URINARY TRACT INFECTION AN AYURVEDIC APPROACH: A CASE REPORT

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ABSTRACT

Background: E. faecalis is a facultative anaerobic bacterium usually found in intestinal flora in humans and animals [1]. As these are gram-positive bacteria they can survive in environments with or without oxygen. These can cause various infections among which urinary tract infections are common. Since it is present naturally in the intestinal tract; nosocomial and food products contaminated with fecal matter can cause transmission [2]. E. faecalis has both natural and acquired immunity from antibiotic treatment, hence these infections are exceptionally challenging to treat due to drug resistance [1,2]. Awareness and information about the illness must be educated to the patients to combat the infection and its complications. A 58-year-old female came to the OPD and elucidated low back pain and burning micturition for the past week. Urine culture revealed the presence of E. faecalis. The patient was managed conservatively with Ayurvedic internal medications. Necessary care was taken to give information and awareness about the infection and protocol to manage the same was formulated and effectively executed. This case report illustrates the utility of Ayurveda concepts and the effectiveness of Ayurveda medicines in treating infectious conditions caused by E. faecalis.

Purpose: The primary priority of the study is to effectively manage Enterococcus fecalis generated UTI with minimal Ayurvedic medications by adopting the concepts of *krimichikitsa* (antimicrobial treatment); gut micro-biota and personalized hygiene.

Observation and Conclusion: Patient had significant relief in low back pain, burning micturition within 2 weeks of medications and complete relief of symptoms at the end of the treatment

Key words- Ayurveda; Enterococcus faecalis; Urinary tract infections; Case Report

1. INTRODUCTION

Urinary tract infection (UTI) is one of the most prevalent infections in the community. Over 404.6 million people across the planet were diagnosed with UTIs in 2019, which accounted for over 200,000 deaths [3]. It is more commonly seen in women of childbearing age and old people. Usually, the adherence of bacteria to the urothelium is prevented by numerous defense mechanisms like the flow of urine, the presence of mucus coat in the stratified squamous epithelium, the high concentration of urea in the urine, osmolality, and lack of nutrients like glucose in the normal urine.

"UTI is defined as the presence and multiplication of bacteria in the urinary tract." Significant bacteriuria is defined as the presence of 10^5 or more colonies of the same organism per ml of urine in females and 10^4 or more of the same organisms per ml of urine in males. The clinical features, diagnosis, treatment, and prognosis vary based on the site of infection, organism, and structural and functional integrity of the urinary tract [4]. Quantitative urine culture remains the gold standard for diagnosis of UTI [5].

Common symptoms of UTI include [6]:

- Painful and burning micturition
- Increased frequency
- Urgency
- Voiding small amount of urine
- Lower abdominal pain
- Urine appears pink/red and cloudy
- Fever or nausea

UTI can be caused by various species of bacteria and caused by Enterococcus species account for more than 30% of all cases in hospitalized patients [6]. The Enterococcus group includes E.faecalis, E.faecium, and E.durans. They typically appear as a pair of oval cocci. E. faecalis is a gram-positive bacterium; that is a part of the human gut microbiota. It can cause a variety of nosocomial infections including urinary tract infections, endocarditis, bacteremia, and wound infection [7]. The drug-resistant nature of this species is always a challenge for the physician to cure the infection. Vancomycin - glycopeptide antibiotic is a drug of choice to manage infections caused by multi-drug resistant bacteria that works by inhibiting bacteria wall synthesis. However, *E. faecalis* and numerous other *Enterococcus* species show acquired resistance to Vancomycin via mutations. Vancomycin-resistant Enterococci prevalence was estimated at 4.8% between 2000 and 2010 and 14.1% between 2011 and 2020 where *E. faecalis* was the most frequently isolated species followed by *E. faecium* [8]. Herein, we have presented a case of UTI caused by Enterococcus faecalis, which was successfully managed by giving Ayurvedic oral medications alone for 30 days without any relapse of the condition.

2. PATIENT INFORMATION

2.1 Patient information

A non-diabetic, non-hypertensive, known case of GERD; 58-year-old female presented to the OPD of Amrita School of Ayurveda on 04/08/2023.

2.2 Symptoms

The patient complained of low back pain and burning sensation while urination for the past week.

2.3 Medical history

As part of her job, she often travels and has the habit of suppressing urination. The history revealed that the patient had irritative voiding symptoms along with low back pain; for which she had consulted a modern medical practitioner which was misdiagnosed as low back pain and advised with NSAIDs. There was no other remarkable family history.

3. CLINICAL FINDINGS AND INVESTIGATION

On the initial visit, the patient mentioned that after intake of NSAIDs heartburn developed; low back pain towards the right side, and burning micturition. On Physical examination, nothing significant was revealed. We suggested urinalysis and no abnormalities were detected. So initial care was given for the heartburn and relieved the same within 5 days. As the main symptoms persisted, she was advised to do a urine culture and sensitivity test and finally got to know the presence of E. faecalis. (Fig No. 1a)

4. DIAGNOSTIC ASSESSMENT

Based on the presenting complaints, clinical findings and investigative reports; diagnosed as UTI.

CULTURE & SENSITIVITY - MANUAL URINE

Specimen	: Urine
	Final Report
Organism(s) Isolated	: Enterococcus faecalis*
Comments	: *Ampicillin susceptible Enterococci are predictably susceptible to amoxicillin, amoxicillin-clavulanate, ampicillin-sulbactam, piperacillin, and piperacillin-tazobactam among non -beta-lactamase producing enterococci. Cephalosporins, Clindamycin and Cotrimoxazole are clinically not effective due to inherent resistance.
Colony Count CFU/ml	: >100,000 CFU/ml urine. Significant bacteriuria

Fig No. 1a: Urine culture showing presence of E. faecalis.

5. THERAPEUTIC INTERVENTIONS

Further focusing on that gram-positive bacterium, the treatment was advised, and complete recovery of the symptom was able to achieve by that patient. Complete follow-up details and medications are listed in Table No. 1.

Table No. 1: Table lists the internal medications given to the patients with dosage.

SL.NO	DRUG	DOSAGE	MODE OF ADMINISTRATION
1.	*Candraprabhā vaṭī*	2BD	Oral
2.	*Gokshuradi Guggulu*	1BD	Oral
3.	*Krimighnavati*	1OD	Oral

5.1 Advice and recommendations

1. Patient was advised to avoid suppression of micturition.
2. She was advised to keep hydrated throughout the day.
3. She was advised to take medicines regularly and do follow-up.

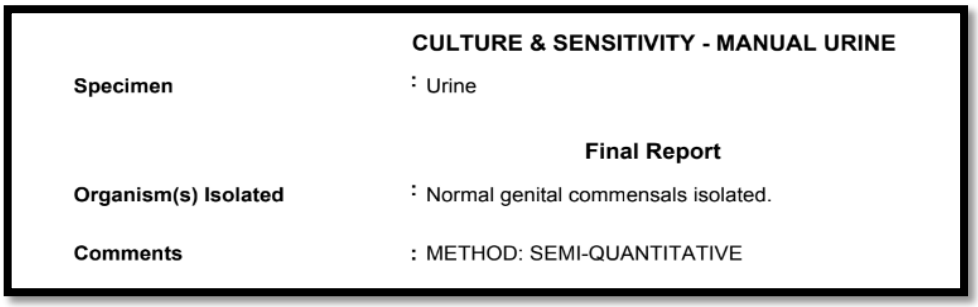
6. FOLLOW-UP AND OUTCOMES

Follow-up and outcomes are enlisted in Table No.2

Table No. 2: Detailed list of the medications and follow-up.

DATE	FOLLOW-UP DETAILS	ORAL MEDICINES	IMPRESSION
04.09.23	Urinalysis reveals the presence of pus cells and epithelial cells; but not that evident. Pus cell count: 2-4/hpf Epithelial count: 4-6/hpf	*Yashtimadhu ksheerapaka*	Low back pain and burning sensation while urination Heartburn.
08.09.23	Follow up was done Advised to do Urine Culture and Sensitivity	*Candraprabhā vaṭī* *Gokṣūradi guggulu*	Heartburn subsided. No relief for low back pain and burning sensation while urination.
11.09.23	Follow-up was done	*Candraprabhā vaṭī* *Gokṣūradi Guggulu* *Krimighna vaṭī*	Mild relief of symptoms. The urine culture report revealed the presence of Enterococcus faecalis. Colony count: >100,000 CFU/ml
22.09.23	Follow-up was done	*Candraprabhā vaṭī* *Gokṣūradi Guggulu* *Krimighna vaṭī*	Moderate relief of symptoms.
30.09.23	Follow-up was done	*Candraprabhā vaṭī*	Symptoms relieved. .

06.10.23	Follow-up was done	No medicines	The symptoms got relieved completely. Repeat Urine culture after 1 week of follow up to address Test of Cure.
17.10.23	Follow-up was done Checked the Urine culture and sensitivity test report of sample taken on **12.10.23**.	No medicines	Absence of bacteria. (Fig No.1b) Urine parameters returned to normal with no relapse of symptoms. Advised to revisit if symptoms reappear



CULTURE & SENSITIVITY - MANUAL URINE

Specimen : Urine

Final Report

Organism(s) Isolated : Normal genital commensals isolated.

Comments : METHOD: SEMI-QUANTITATIVE

Fig No:1b: Post intervention Urine culture report showing absence of bacteria

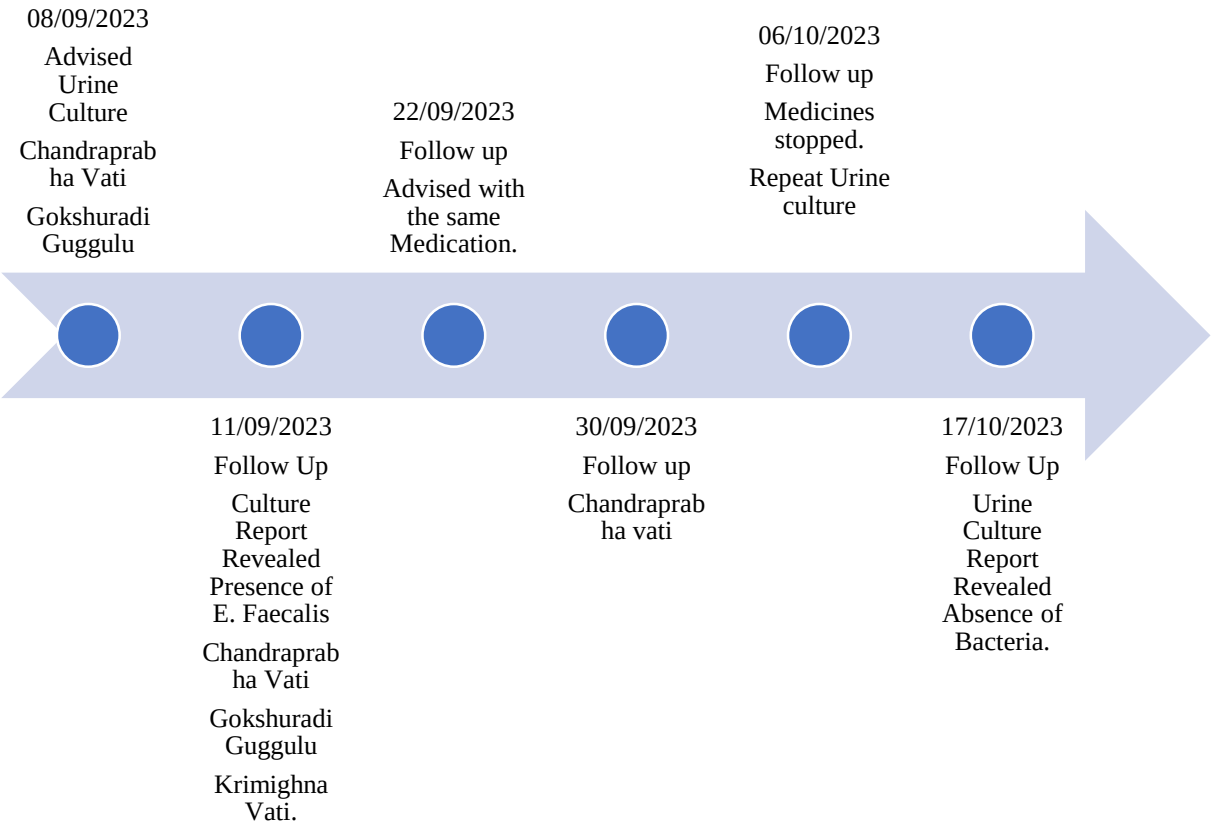


Fig No. 2: Timeline of intervention and investigation

7. DISCUSSION

The patient reported a remarkable improvement in her presented symptoms with a total treatment period of 30 days. Periodical observations were done once in a week. As the patient was unable to take medicines due to GERD; therefore, initial care was given to manage heartburn by advising *Yastimadhu ksheerapaka* once daily for 5 days which got subsided after her first follow-up. The low back pain and burning micturition were persisting, for which urine culture and sensitivity were advised, and that revealed the presence of Enterococcus faecalis. Due precautions were taken in selecting less irritant medicines to avoid gastric irritation as she was a known case of GERD. The main treatment was required for E.faecalis; for which *krimihara* (Antimicrobial) treatment was given. After 30 days, the patient's urinary symptoms were significantly improved and the burning micturition was absent. The patient was advised to repeat urine culture to address Test of cure after 7 days of stoppage of medicine; the report revealed absence of bacteria. Relapse of GERD symptoms were absent during the course of treatment and no adverse events were observed during this period.

The ingredients of *Krimighna vaṭī* are *Embelia ribes* [9], *Butea monosperma* [10], *Allium sativum* [11], *Vitex negundo* [12], *Ferula foetida* [13]. These drugs have proven antimicrobial action; which is now found effective in Urinary tract infections caused by E. faecalis.

The ingredients of *Gokshuradi Guggulu* [14] are; *Tribulus terrestris, Zingiber officinale, Piper nigrum, Piper longum, Terminalia chebula, Emblica officinalis, Terminalia bellirica, Cyperus rotondus* and *Commiphora mukul. Emblica officinalis* and *Commiphora mukul* has been known to show antioxidant and anti- inflammatory properties whereas *Tribulus terrestris* and *Emblica officinalis* has analgesic action. *Terminalia chebula* has been known to show nephro protective action; and immune-modulatory property of *Piper nigrum* which are proven to be effective in the management of UTI. Hence this medicine was found to be useful in the UTI in relieving burning micturition and low back pain.
Chandraprabha vati consists of 37 ingredients which is of plant and mineral origin. It has been known to show diuretic, analgesic, anti-spasmodic, anti-inflammatory, anti-bacterial and anti-oxidant action. The combined action of this formulation found effective in relieving the symptoms of UTI [15].

Ayurvedic medications have proven action against many microbes, one such case was detailed above. Mainly E. faecalis, which often seems to be difficult to treat was able to manage with certain Ayurvedic medicines. It was found to be effective against multidrug-resistant bacteria and also in improving the general health of the patient. The patient has not reported a relapse of symptoms in one month follow-up period She was advised to continue follow-up regularly and to report if any of the symptoms reappear. This case report illustrates the utility and the effectiveness of Ayurveda medicines in treating infectious conditions caused by E. faecalis. We need to observe more cases with similar complaints to draw statistically significant results on the effectiveness of Ayurvedic medicines on E. faecalis and also on other multi-drug resistant bacteria.

8. CONCLUSION

In conclusion, our case illustrated the potential action of Ayurvedic medications in managing UTIs caused by the drug-resistant species of Enterococcus bacteria – "Enterococcus faecalis". This study suggests that by adopting the Ayurvedic concepts of *krimichikitsa* (antimicrobial treatment); gut microbiota and personalized hygiene, the condition can be conservatively managed. Thus, this case suggests the need for research to develop a treatment protocol that is cost-effective and time-saving for the management of other drug-resistant strains of bacteria.

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