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LUTS in COVID-19 sequelae: A retrospective study

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Abstract--Objectives: The corona disease became a major public health problem leading to a pandemic. Millions of individuals were infected or led to mortality because of the disease. Apart from fever and cough, many more clinical features and indicators, post COVID-19 are still unknown. In the present study we demonstrate the onset of lower urinary tract symptoms (LUTS) after COVID-19 recovery. Methods: We retrospectively assessed 78 patients from with a minimum one month and maximum 6-month history of COVID-19 positivity. Only mild cases were selected for the present study. All the patients recovered with home quarantine. The complete symptoms and the condition of the patients were noted. All the patients were between 24-70 years of age. We analysed the prime associated symptoms and post COVID sequelae of the patients. Results: Among the 78 patients, 66 had increased urgency and frequency, 6 patients had Obstructive urination. 6 individuals had both the presentations. Out of the total patients, known diabetic were 62, non-diabetics were 16 and newly diagnosed were 3 patients. Conclusions: The present

retrospective study is the first to be reported in South Indian population and which demonstrated that increased lower urinary tract symptoms are common presentation as a post COVID sequelae. Further investigations with a substantial numeral of patients would more authenticate the present study.

Keywords---COVID-19 pandemic, lower urinary tract symptoms, Diabetic, Long-term sequelae, culture growth, Drug.

1. Introduction

In the end of 2019, a massive volume of patients was admitted to the hospital with pneumonia of unknown aetiology in Wuhan-China. The prime target for the virus invasion is the respiratory route. This novel disease was named as coronavirus disease-2019 (COVID-19) by the WHO on February 11, 2020 [1]. Concurrently, the international virus classification commission announced the novel coronavirus as SARS-COV 2. It is communicable to a great extent and destroyed a massive fragment across the globe on diverse routes of transmission. Sudden transmission of COVID-19 and the short fall of discrete remedial measures precipitated as a pandemic. On January 31, 2020, the WHO stated, COVID-19 was indexed as the public health emergency of international implication [2].

Infected, suffer mild clinical feature such as fever, upper respiratory tract symptoms, dyspnea, and diarrhoea or are asymptomatic, in severe cases, multi organ collapse, and death. [3]. The frequent complications in COVID-19 patients are cardiovascular disease, diabetes mellitus, and hypertension. Post covid sequelae have become common among the population. There is no test to diagnose post-COVID conditions, and the population may have a broad spectrum of symptoms that could come from other health complications. This can make it tough for healthcare providers to realise post-COVID conditions [4].

LUTS is a combined caption for several symptoms related to the lower urinary tract. The symptoms are divided into irritative, obstructive, or mixed. LUTS is associated with multiple pathologies comprising of either obstructive pathology (benign prostate hyperplasia) or non - obstructive pathologies (autonomic bladder) or mixed. Frequent urination is the major typical symptoms in urological disease [5]. However, during the infection urologic symptoms were common. We observed that COVID-19 recovered patients undergo adverse condition with LUTS. Patients principally reveal increased dysuria symptoms post disease. The study was focussed to evaluate the effect of COVID-19 on LUTS in this study [6].

2. Materials and Methods

2.1.1. Study design and settings

A retrospective cross-sectional study was carried out from July 2020 to Feb 2022 in a tertiary care centre, Chennai, Tamilnadu.

2.1.2. Participants

Patients who had previously recovered from home quarantine for covid -19, age group >18 and patients with ASA I and II were included for the present study. The exclusion criteria were patients who had severe covid infections, patients with history of recurrent urinary tract infections pre-covid and patients with ASA III and above.

2.1.3. Data collation

Participants were followed-up either at the institute's post COVID-19 clinic then referred for urology evaluation. The pertinent medical history and prime symptoms were noted. In total, 78 patients were involved for our study. All patients underwent ultrasound and urine routine examination including culture sensitivity. Among these patient's symptoms analysis yielded; 66 with urgency in urinating or frequent urination, 6 with obstructive urination and 6 with both these symptoms. The notified symptoms may arise as de novo with fever and UTI symptoms.

The total patients were classified based on diabetes, 59 were known diabetic, 16 were not diabetic and 3 were newly diagnosed with diabetes. Out of the total 78 individuals, 38 were male; 40 were female.

3. Results

In urine routine examination, pyuria (>5/HPF) was observed in 66 patients, yeast was seen in 3 samples, bacteria were present in 26 patients. Fig 1 depicts the culture positives were 40 samples, out of which 38 were diabetic and the bacteria found were; 28 E. coli, 10 Klebsiella and 2 citrobacter, 2 were not diabetic. Culture negative were 38 of which 24 were diabetic patients and 14 were non-diabetic.

Of the 38, males; 20-40 years of individuals were 10, 41-60 age group were 6 and above 61 were 22. Among the females, 30 were in the age group of 20-40, 6 were in the age group of 41-60 and 4 were in the age group of above 60. Among the patients who underwent ultra-sonogram, 12 patients showed normal features, characteristics of cystitis was observed in 39 subjects, benign prostatic hypertrophy was detected in 21 patients, abscess was distinguished in 6 patients.

Clearance of infection after 1month, 3months and 6 months was studied. In culture positives, clearance of the infection after 1 month with the treatment of antibiotic was observed in 12 cases, after 3months improvement was observed in 10 samples, prospective changes after 6 months was noted in 2 cases, recurrence of infection was observed in 2 subjects. Patients who did not turn up were 2. 38 culture negative individuals were treated as over active bladder, 26 patients were treated with single drug Mirabagron, improved in 1-3 months. 12 individuals were treated with a combination with Solifenacin.

Participants with Benign Prostate hypertrophy (BPH) were 20 (Fig 2). Of which culture negative were managed with Mirabegron with Tamsulosin for 1-3 months;

the infections were cleared. Further the dual therapy tapered to Tamsulosin. On the other hand, among the culture positive cases (12), the patients were treated with Mirabegron and Tamsulocin with antibiotics. 6 of them improved in 3 months and 2 of them had a prolonged treatment till 6 months. The unresolved 4 were further treated with operative procedures. 2 individuals underwent transurethral resection of prostate and 2 persons had cystoscopic deroofting for prostate abscess. The left over 2 female patients had OTIS urethrotomy for female outlet obstruction (Fig 3).

3.1. Statistical Significance

Evaluation of the cases based on diabetic and non-diabetic and gender wise distribution was examined. Of which, 62 were diabetic and 16 were non-diabetic. Among the females 40 (51.28 %), 38 (61.29%) were diabetic and 2 (12.5%) were non-diabetic. In the males 38 (48.72 %), 24 (38.71 %) were diabetic and 14 (87.5 %) were non-diabetic. The p-value was <0.001. Age wise analysis was performed, wherein among the 20-40 age group (40), 37 (59.68%) were diabetic and 3 (18.75 %) were non-diabetic. In the age group 40-60 (12), 6 were diabetic and 6 were non-diabetic. In 61 and above age group; 26 (33.33), 19 (30.65%) were diabetic and 7 (43.75) were non-diabetic. The p-value was <0.001. Culture growth was analysed; in which, culture negative was 38 (48.72 %); of which 24 (38.71%) were diabetic and 14 (87.5 %) were non-diabetic (Fig 4). Among the culture positives 40 (51.28 %); 38 (61.29%) were diabetic and 2 (12.5%) were non-diabetic. Based on the bladder conditions; 40 (51.28%) were normal, among which 38 (61.29%) were diabetic and 2 (12.5%) were non-diabetic. Among the overactive bladder cases 38 (48.72%); 24 (38.71%) were diabetic and 14 (87.5%) were non-diabetic.

Among the 78 patients involved in the present study, culture growth was analysed, 40 (51.28%) were positive and 38 (48.72%) were negative. Among these culture positives, 28 (70%) were found to be *E. coli*, 10 (25%) were *Klebsiella* and 2 (5%) were *Citrobacter*. Based on the drug treatment to the patient's recovery analysis, single drug was effective for 54 (69.23%) patients and multidrug was demanding for 24 (30.77%) patients. Patient recovery and presentation was investigated, 12 (15.79%) patients recovered in 1 month, 44 patients recovered in 1-3 months and 14 recovered in 3-6 months. 2 (2.63%) had recurrent infections, 2 had deroofting for prostatic abscess and 2 underwent transurethral resection of the prostate (Fig5).

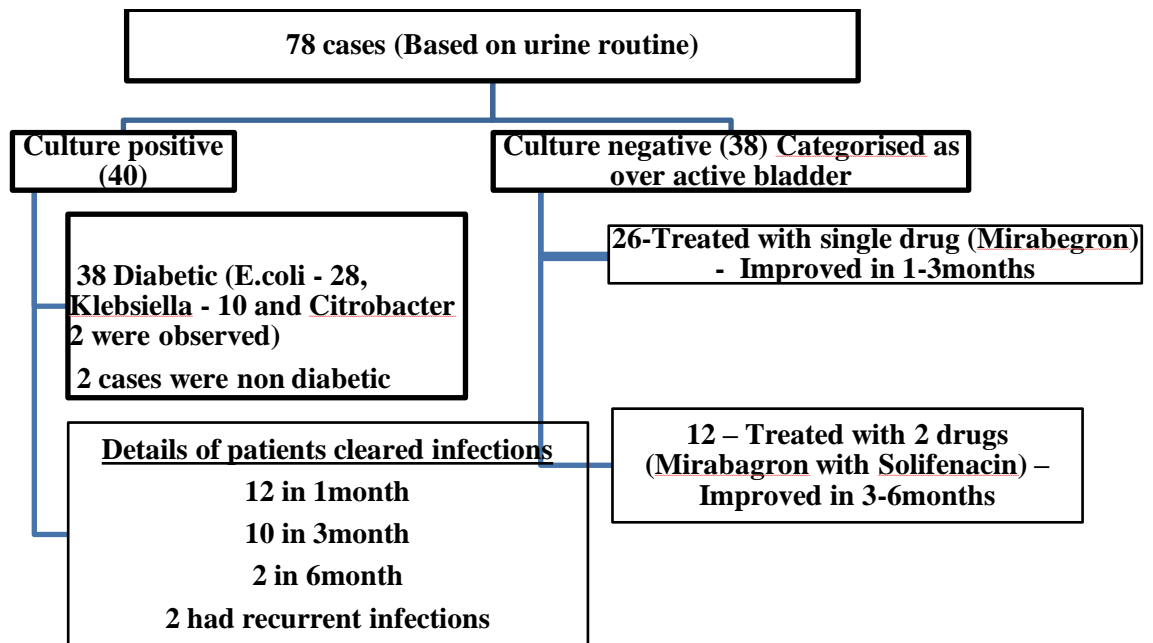


Fig 1. Investigation of the cases based on Urine routine

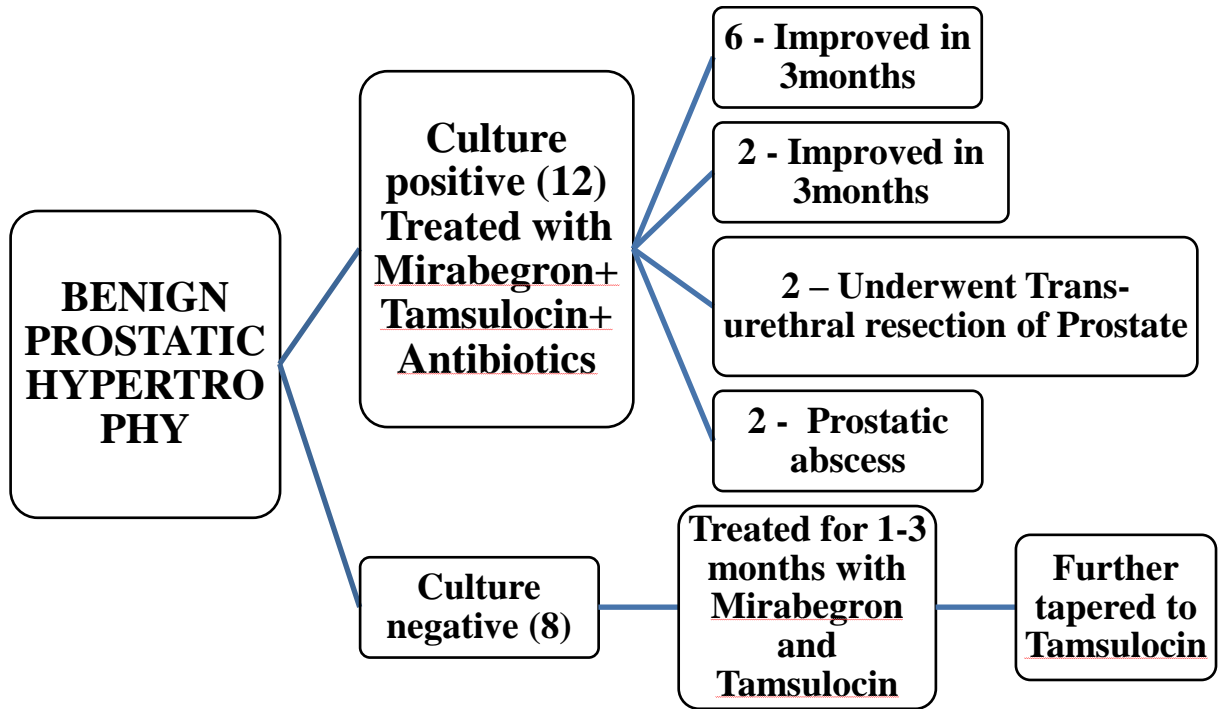


Fig 2. Classification of the cases based on Benign Prostatic Hypertrophy

6 - PATIENTS REQUIRING OPERATIVE PROCEDURES	2 – Transurethral resection of Prostate
	2 – Cystoscopic deroofting for prostate abscess
	2 – OTIS Urethrotomy for female outlet Obstruction

Fig 3

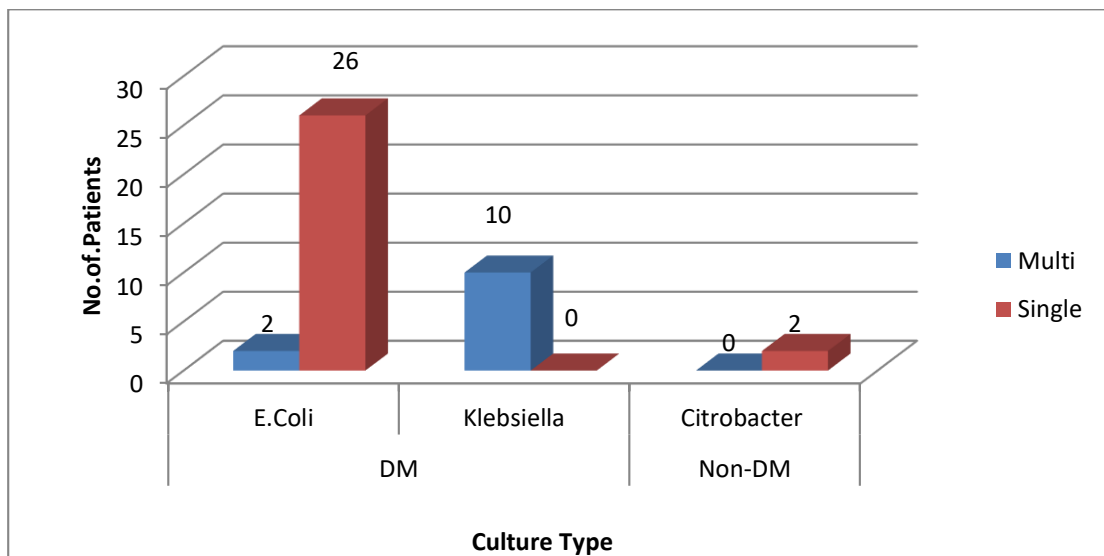


Fig 4. Graphical representation of Diabetic and non-diabetic cases response to Treatment

4. Discussion

COVID-19 was the most severe contagion in the recent years which imposed an earmarked burden on global health care providers, the economy, society, and mental peace [7]. Lower urinary tract symptoms are a common presentation in post covid patients. It is a long drawn disposition taking more than 3 months to improve which is often overlooked [8].

Very few studies are reported in India on the potential for urinary-related Covid infections and the sequelae. Urologists have toiled in COVID-19 clinics during the pandemic period [9]. We noticed that some patients with COVID-19 deteriorate from dysuria and irritative urinary symptoms. To our understanding, there is limited report in the literature investigating the effect of COVID-19 on LUTS from this part of the country. Therefore, we retrospectively formulated this study and increased LUTS was found in post COVID-19 recovered patients after at least month of recovery [10]. Jennifer K. Logue et al and fellow workers focused on a longitudinal prospective cohort study of adults with laboratory-confirmed SARS-CoV-2 infection. The patients reported symptoms from 30 to 90 days after illness and which persisted to 110 days [11].

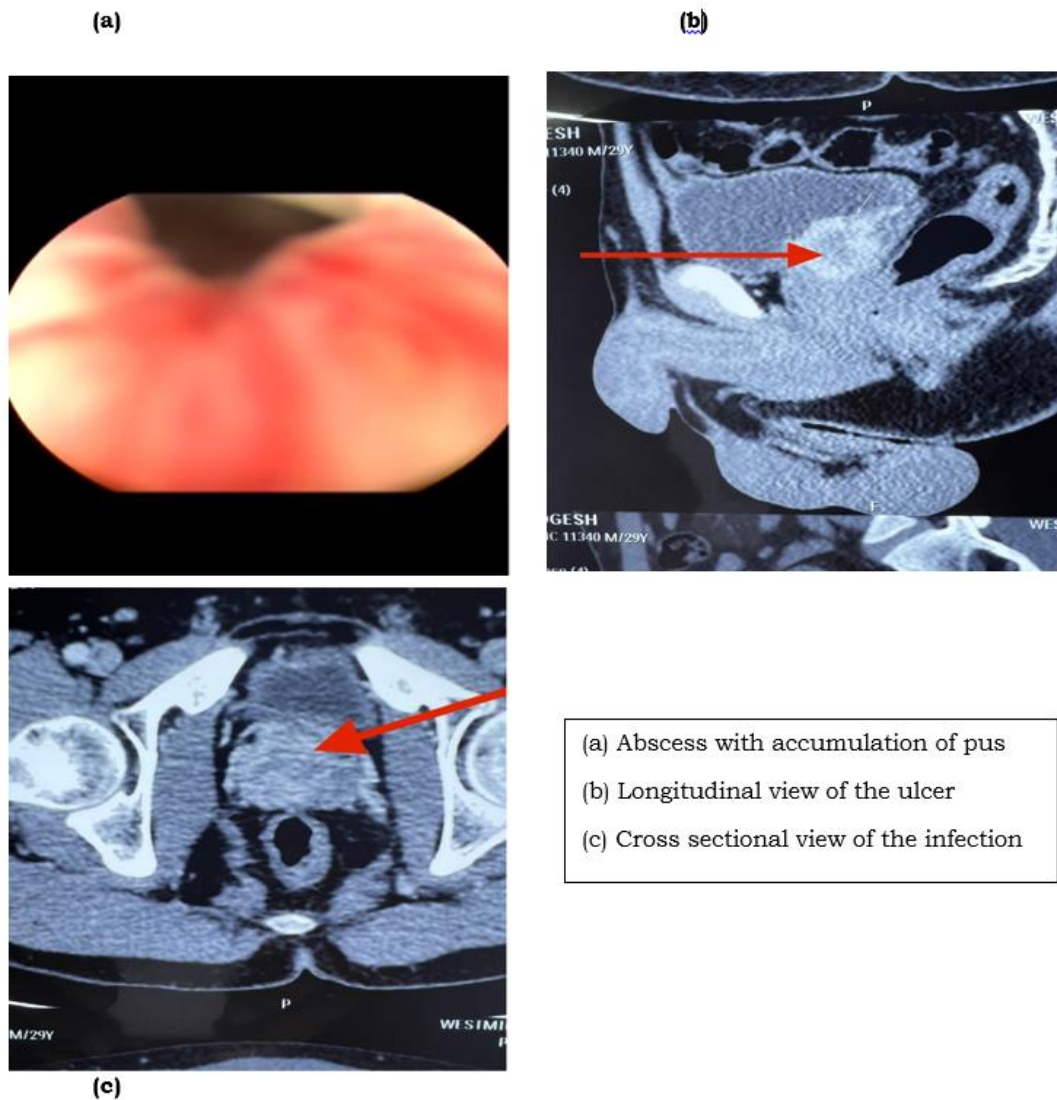


Fig 5: Computed tomography imaging

Hossam Nabeeh and his associates evaluated the impact of COVID-19 on LUTS of patients with benign prostatic hyperplasia (BPH). They outlined the uncertain aspects for urine retention in such patients. The enrolled patients were rated based on the uroflowmetry, and pelvi-abdominal ultrasonography for prostate volume and post voiding residual urine (PVR) determination [12]. Jan-Niclas Mumm and his colleague analysed 57 covid patients with urinary urgency and other symptoms. The author stated, viral cystitis due to SARS-CoV-2 causes the urine recurring symptom. It is probably due to the replication of virus in the urothelial cells or systemic inflammation, such as endothelitis, leading to the symptoms such as irritative symptoms of the lower urinary tract and high urinary frequency [13].

Ibrahim Karabulut et al., observed influence of benign prostatic hyperplasia (BPH)-related lower urinary tract symptoms (LUTS), which arise as a natural consequence of aging with COVID-19 [14]. Osman Can et al., performed a significant study on 94 patients. The investigators determined that urinary irritative symptoms occur not with regard to COVID-19 intensity. Therefore, patients who present with LUTS must be related for post COVID-19 sequelae when the rationale is speculative [15].

In the present study we observed that LUTS is a common presentation of post COVID cases. It is a long lasting presentation and in some patients it even takes more than 3 months to improve [16]. No significant male and female presentation was seen. Irritative LUTS was significantly more common among our study. LUTS in diabetics were more common [17]. Males above 60 years with Benign Prostate Hypertrophy had increase in symptoms of post COVID diagnosis. Documented UTI takes longer than 3 months to get cleared in many patients [18]. Surgery was required for 6 patients. Our study limitations were single study site and less recruiters for the investigations.

5. Conclusion

Long-lasting sequelae in outpatients have not been well delineated. To our learning, the study displays the extended follow-up symptom evaluation after COVID-19 disease in South India. Our investigations indicate the importance of COVID-19 infection far beyond acute infection, even among those who suffered mild illness. Diversified long-term scrutiny will be needed to completely comprehend the consequences of COVID. Family physicians should be well informed that a magnificent fraction of the men in the age group of 60 years and above deteriorate from LUTS, and it is essential to generate the relevant history during the process of consultation to avoid additional complications related to LUTS.

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Competing interests

All authors declare no competing interests.

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