**INTRODUCTION**

- Diarrhoea is one of the most common gastrointestinal disorders leading to significant impairment in quality of life in kidney transplant recipients. The prevalence of diarrhoea in solid organ transplant recipients has been estimated to vary from 20% to 50%.
- In kidney transplant recipients, there is higher frequency of opportunistic pathogens infections (e.g., Cryptosporidium or cytomegalovirus), higher likelihood to develop chronic diarrhoea (e.g. Norovirus), medication induced diarrhoea (e.g., mycophenolate, tacrolimus) and impact of diarrhoea on kidney allograft function.
- Norovirus infection has emerged as one of the important causes of persistent and chronic diarrhoea in kidney transplant recipients. The incidence of Norovirus infection in kidney transplant recipients has been reported ranging from 7.3% to 35% in various studies. It is associated with significant weight loss, graft dysfunction, morbidity and chronic viral shedding.
- In absence of any specific treatment for Norovirus infection, mainstay of treatment is supportive care and reduction of immunosuppression. It is necessary to reduce immunosuppression to achieve relief of symptoms and clearance of viral shedding.

**AIMS AND OBJECTIVES**

- To evaluate the clinical significance of Norovirus infection in kidney transplant recipients presenting with persistent or chronic diarrhoea.

**MATERIALS AND METHODS**

- **Study design:** Single centre, prospective observational study
- **Study Population:**
  - **Inclusion criteria:** Between December 2019 to November 2020, all kidney transplant recipients presenting with persistent diarrhoea (≥3 days in 24 hours for ≥7 consecutive days) or chronic (≥28 days) diarrhoea.
- **Exclusion criteria:** Patients with prior history of inflammatory bowel disease, patients were evaluated in stepwise manner to determine cause of diarrhoea. Stool samples were evaluated for Norovirus infection by RTCPCR assay.
- **Specimen:**
  - Stool specimen were collected in container (Cary-Blair Transport Media) <5 gm. For low volume samples, a Fecal Swab Cary-Blair transport were used. Cary-Blair specimens were frozen at -94°F (-70°C).
- **Methodology:**
  - Tests were performed using TaqMan real-time reverse transcription-PCR assay (Fast-track diagnostic: FTD 45-64 Kit). The detection and typing of Norovirus were done by conserved nucleotide sequences of the ORF1-ORF2 junction region of the Norovirus genome.
  - Patients were followed for 12 months after enrolment. Response to treatment in terms of clinical and laboratory parameters were noted.

**RESULTS**

**OUTCOMES ON FOLLOW UP**

**Renal function**

- Over all: 14 patients (48%) had AKI at enrolment
- 9 patients (31%) had worsening of renal function at 12 months, 5 (17%) were initiated on maintenance dialysis.
- *Chronic allograft dysfunction defined as presence of proteinuria or ≥25% rise in creatinine from last post-transplant creatinine or on basis of chronic changes on graft biopsy.*
- **AKI defined as ≥25% rise in creatinine at enrolment compared to value 3 months before onset of diarrhoea**
- **Worsening of renal function at 12 months defined as ≥25% rise in creatinine, compared to value at enrolment**

**Weight**

- **No AKI:**
  - Weight before onset of diarrhoea (mean ± SD): kg 63.1 ± 11.3
  - Weight at enrolment (mean ± SD): kg 56.7 ± 11.1
  - Weight loss: (mean ± SD): kg 6.3 ± 3.3
- **Optimum and steady weight gain**
  - Patients with persistent weight loss: 7 (24%)
  - Patients with weight gain: 18 (58.6%)
  - Patients with steady weight gain: 12 (38.7%)

**OUTCOMES ON FOLLOW UP**

**Chronic Viral Shedding**

- Norovirus was detected in 9 out of 11 samples evaluated at 12 months of follow up.

**COMPARISON WITH OTHER STUDIES**

**LIMITATIONS**

- It was a single centre study.
- Follow up stool samples were not available at periodic interval in all cases.
- We had short duration of follow up.
- No control group (Kidney transplant recipient without diarrhoea or diarrhoea population) were included in our study.
- Stool samples were not evaluated for all possible gastrointestinal viral / bacterial / parasitic pathogens using molecular techniques.

**CONCLUSION**

- Norovirus is common cause of persistent and chronic diarrhoea in renal transplant recipients.
- It is seen late after transplant and is associated with significant weight loss and graft dysfunction.
- Immunosuppression reduction is associated with improvement in diarrhoea and weight gain in majority of patients. However, renal function may not improve.
- Viral shedding may continue despite improvements in symptoms.

**REFERENCES**


**Evaluation of Noro virus infection in Kidney transplant recipients presenting with persistent or chronic diarrhoea**

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