Safety and Efficacy of Saccharomyces Boulardii in Acute Adult Diarrhea
Dr. Ankur Gupta1, Dr. Amit Choudhary2, Dr. Abhishek Singhai3, Dr. Rajesh Kumar Jha4
1,2Postgraduate Student, Department of General Medicine, Sri Aurobindo Medical College & PGI, Indore, India
3Assistant Professor, Department of Internal Medicine, All India Institute of Medical Sciences, Bhopal, India
4Professor & Head, Department of General Medicine, Sri Aurobindo Medical College & PGI, Indore, India

*Corresponding author
Dr. Ankur Gupta
Email: drguptaankur91@gmail.com

Abstract: Probiotics are defined as “live micro-organisms that confer a health benefits on the host when administered in adequate amounts.” The only yeast, Saccharomyces boulardii is used in many countries as both preventive and therapeutic agent for diarrhea and other gastrointestinal disorders. This study was planned to demonstrate clinical efficacy and safety of Saccharomyces boulardii in acute adult diarrhea. This is a retrospective study conducted at Department of General Medicine of a tertiary care centre. All adult patients (age >18 years) who presented with diarrhea of less than 2 weeks duration were evaluated for possible inclusion in this study. In S. boulardii group, patients were managed by WHO-CDD protocol for diarrhea plus S. boulardii (250 mg bid) for 5 days. In the control group patients were managed by WHO-CDD protocol only. The target criteria were the changes in the frequency of stools over the preceding 24 hours and its consistency. At the two check-up, patients were asked about any side-effects, tolerability and general well being. Under S. boulardii group, patients had significant reduction in the score for stool frequency and stool quality than control group after two days treatment. In secondary variables, significant advantage of S. boulardii over control: improvement in nausea and positive assessment of treatment by patients on day 3. No severe side effects were observed in any patient and the tolerance of the active medication was described by both doctor and patient as very good or good. S. boulardii has been used as probiotic since last 6 decades, and it has been investigated in several clinical trials worldwide. S. boulardii is significantly effective for the prevention of acute adult diarrhea.

Keywords: Probiotic, diarrhea, saccharomyces.

INTRODUCTION
Probiotics are defined as “live micro-organisms that confer a health benefits on the host when administered in adequate amounts.” The only yeast, Saccharomyces boulardii is used in many countries as both preventive and therapeutic agent for diarrhea and other gastrointestinal disorders [1]. S. boulardii is a tropical strain of yeast first isolated from lychee and mangosteen fruit in 1923 by French scientist Henri Boulard. He first isolated the yeast after he observed natives of Southeast Asia chewing the skin of lychee and mangosteen in an attempt to control the symptoms of cholera. S. boulardii has been shown to be non-pathogenic, non-systemic (it remains in the gastrointestinal tract rather than spreading elsewhere in the body), and grows at the unusually high temperature of 37°C. S. boulardii has several different types of mechanisms of action which may be classified into three main areas: Luminal action, trophic action and mucosal anti-inflammatory effects. S. boulardii has antitoxin effects (inhibit toxins of Clostridium difficile, enteropathogenic E. coli, Cholera), inhibits growth of pathogens (Candida albicans, Salmonella typhimurum, Yersinia enterocolitium, Aeromonas hemolysin) and maintain epithelial integrity by preventing distribution of adhesive proteins between intestinal epithelium. S. boulardii exerts trophic effects restoring the intestinal homeostasis. S. boulardii also interferes with the host cell signaling pathways and decreases the expression of inflammation-associated cytokines such as IL-8, TNF-α. S. boulardii also exerts prebiotic effects as its cell wall consists of glucans, mannoproteins and chitins, which serve as excellent substrates for microbial fermentation.
Acute adult diarrhea is a broad classification for diarrhea that includes illnesses that may develop quickly, but are typically short lived and sporadic. The etiologies of acute adult diarrhea may include infectious agents (Bacteria, viruses or amoeba) or may be idiopathic. This study was planned to demonstrate clinical efficacy and safety of Saccharomyces boulardii in acute adult diarrhea.

MATERIALS & METHODS

Study Design: This is a retrospective study.

Study Setup: This study is conducted at Department of General Medicine of a tertiary care centre.

Study Duration: The duration of study was two years; November-2014 to October-2016.

Sampling: Purposive sampling technique is used for selection of desired samples according to inclusion criterion.

Inclusion criteria: All adult patients (age >18 years) who presented with diarrhea of less than 2 weeks duration were evaluated for possible inclusion in this study.

We retrospectively evaluated case files of all adult patients of either sex who admitted in hospital with diarrhea in last two years. We have divided study population in two groups; In S. boulardii group, patients were managed by WHO-CDD protocol for diarrhea [2] plus S. boulardii (250 mg bid) administered orally either in liquid form or capsule form for 5 days. In the control group patients were managed by WHO-CDD protocol only. Out of 250 patients of diarrhea, 128 patients had been treated with S. boulardii and 122 patients had been treated with routine supportive treatment only. Demographic characters like age, sex, weight, date of onset of diarrhea, previous treatment (where applicable), number and consistency of stools, vomiting, body temperature, sign of dehydration and any other data by clinical examination of all subjects were noted. Routine investigations including complete blood counts, random blood glucose, serum creatinine, serum electrolytes and stool examination were recorded. Data of both groups was recorded before the first treatment (day 1) and during treatment on days 3 and 7. The target criteria were the changes in the frequency of stools over the preceding 24 hours and its consistency. At the two check-up, patients were asked about any side-effects, tolerability and general well being.

Ethical Consideration: Prior to conduct of the present study, the protocol of the study was submitted to ethical and scientific committee of hospital. After getting due approval from these two committees, the present study was initiated.

Statistical Technique: Microsoft Excel® and SPSS® 20 for Windows® were used for data storage and analysis. The qualitative data were expressed in percentages and quantitative data were expressed as mean ± standard deviation. Student’s t test and Chi-Square test were used to determine statistical difference between variables.

RESULTS

Two hundred fifty patients were included in the study, 128 patients in S. boulardii group and 122 patients in control group. Patient baseline characteristics in control and study groups were comparable (Table 1).

Under S. boulardii group, patients had significant marked reduction in the score for stool frequency and stool quality than under control group after two and five days treatment. (Table 2)

<table>
<thead>
<tr>
<th>Table 1: Demographic Characteristics of All Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient characteristics</td>
</tr>
<tr>
<td>Age (± SD)</td>
</tr>
<tr>
<td>Sex (Female %)</td>
</tr>
<tr>
<td>Bacteria Isolated in stool</td>
</tr>
</tbody>
</table>

NS= Nonsignificant

Table-2: Stool characteristics

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>S. boulardii group (n=128)</th>
<th>Control Subjects (n=122)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of diarrhea (days)</td>
<td>4.2</td>
<td>5.1</td>
<td>0.001</td>
</tr>
<tr>
<td>Mean number of stools reported on day 0</td>
<td>10.8</td>
<td>10.5</td>
<td>NS</td>
</tr>
<tr>
<td>Mean number of stools reported on day 3</td>
<td>3.1</td>
<td>4.5</td>
<td>0.01</td>
</tr>
<tr>
<td>Mean number of stools reported on day 6</td>
<td>1.5</td>
<td>3.7</td>
<td>0.001</td>
</tr>
</tbody>
</table>

NS= Nonsignificant

In secondary variables, significant advantage of S. boulardii over control was noted in the form of: improvement in nausea and positive assessment of treatment by patients on day 3.

No severe side effects were observed in any patient and the tolerance of the active medication was described by both doctor and patient as very good or good.

DISCUSSION
Diarrhea is defined by the World Health Organization as 3 or more passages of loose or watery stool and increments in stool frequency in a 24-hours period. The most common cause of diarrhea is a gut infection (viral, bacterial, and parasitic). Other causes include side effects of medicine (especially antibiotics), infections not associated with the gastrointestinal tract, food poisoning, and allergy [3]. Diarrhea is also categorized into acute (lasts several hours or days) and persistent (continues for 14 days or longer). The treatment of choice for dehydration caused by diarrhea is the replacement of the lost fluids and electrolytes by oral rehydration solution. As rehydration therapy does not significantly decrease the frequency/length of diarrhea, scientists are interested in adjunctive treatments [4]. Probiotics as one of the alternative approaches for prevention and treatment of diarrhea are living microorganisms that provide various beneficial health effects in humans. Several studies of S. boulardii have been done in children and adults in the treatment of acute diarrhea [5]. The results of our studies are consistent with some of these studies. S. boulardii is generally administered in lyophilized powder corresponding to approximately $3\times10^{10}$ cfu/g which unless exogenously administered is not found as part of the intestinal microflora of humans and under normal conditions it does not permanently colonize the gastrointestinal tract [6].

Daily administration as lyophilized powder guarantees vital persistence of yeast along the whole gastrointestinal tract, in fact, this yeast, because of its peculiarity it’s not absorbed, it has no systemic impact, is resistant to gastric acids and to bile secretions [7].

CONCLUSION
S. boulardii has been used as probiotic since last 6 decades, and it has been investigated in several clinical trials worldwide. S. boulardii is significantly effective for the prevention of acute adult diarrhea.

REFERENCES