



## Original Research Article

### Nosocomial Pneumonia in Patients with Prolonged Ryles Tube Insertion

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#### ABSTRACT

Ryles tube insertion is a commonly done procedure in surgical patients for a variety of indications. The present study aims at measuring the incidence of micro-aspiration pneumonia in patients with prolonged Ryles tube insertion. The study was done on 25 patients (19 males and 6 females with age ranging from 26 – 73 years) over a period of 6 months. The patients were admitted in surgical wards for indications as follows: Peptic ulcer perforation (13 patients), Jejunal perforation after blunt abdominal trauma (3 patients), reversal of ileostomy (8 patients), and distal gastrectomy for stomach cancer (1 patient). All the patients were observed regarding the necessity and duration of Ryles tube insertion and incidence of postoperative nosocomial pneumonia in such patients. Out of 25 patients included in the study Ryles tube was removed within 48 hours in 21 patients. In 2 patients with peptic ulcer perforation, 1 patient with jejunal perforation and in 1 patient with ileostomy reversal there was surgical leak and Ryles tube was reinserted and kept for a longer duration. 3 out of these 4 patients developed symptoms pertaining to pneumonia and radiograph of the chest was suggestive of the same. One patient with peptic ulcer perforation succumbed to the respiratory complications and the other 2 improved after the Ryles tube was removed. The study concludes that prolonged use of Ryles tube is associated with a higher incidence of postoperative nosocomial pneumonia.

#### Keywords

Ryles tube;  
Nasogastric decompression;  
Micro aspiration pneumonia,  
Gram negative pneumonia

#### Introduction

Anastomotic dehiscence is one of the most feared complications for any surgeon after any elective or emergency surgery concerning the bowel. Ryles tube is used for the decompression of the bowel to prevent anastomotic dehiscence. Use and benefit of nasogastric decompression after intestinal surgery was first demonstrated by Wangenstein in 1932 (Wangenstein, 1932).

Nasogastric intubation drastically reduced morbidity and mortality after gastrointestinal surgery and was one of the most important advances in surgical care in the early 20th century. Since that time routine placement of nasogastric tube or Ryles tube has become standard practice after any gastrointestinal surgery (Isbister, 1970; De Costa and Taylor, 1990; Herrington, 1965;

Gerber, 1963; Jamieson *et al.*, 1992). There have been some studies in the last few decades which suggest that nasogastric intubation was more harmful than beneficial for some operations (Nelson *et al.*, 2005; Bauer *et al.*, 1985; Nagler *et al.*, 1963). Outcomes for routine postoperative Ryles tube insertion have been studied for several operations (Wei *et al.*, 2014; Sapkota *et al.*, 2013; Bauer, 2013; Roland *et al.*, 2012). These studies have uniformly demonstrated that routine placement of Ryles tube is unnecessary. It is believed that prolonged use of Ryles tube can cause microaspiration of small amounts of gastric and intestinal contents through the oropharynx into the lower airways which can lead to pulmonary complications like pneumonia (Gouzi *et al.*, 1998; Ocen *et al.*, 2004). The studies on bacteriology of aspiration pneumonia suggest that most common etiologic agents involved are Gram-negative enteric bacilli including *Escherichia coli*, *Klebsiella pneumoniae*, *Haemophilus influenzae* and *Pseudomonas aeruginosa* and the plausible mechanism remains the aspiration of endogenous flora (Brook, 1981). The present study aims at measuring the incidence of micro- aspiration nosocomial pneumonia in patients with prolonged Ryles tube insertion.

## **Material and Methods**

This study included 25 patients who were admitted in a single general surgery unit in whom elective or emergency gastrointestinal surgical procedure was done.

**Type of study:** Prospective

**Inclusion criteria:** All the patients operated for gastrointestinal procedures in whom Ryles tube was inserted.

**Exclusion criteria:** The patients who were having a history of respiratory complaints

prior to surgery were excluded from the study.

**Place of study:** Department of Surgery, Department of Pathology and Department of Microbiology, JN Medical College and Hospital, Aligarh

**Duration of study:** 6 months extending from May 2014 to October 2014

**Patient's information and methods:** The study was done on 25 patients including 19 males and 6 females with age ranging from 26 – 73 years. 13 patients had peptic ulcer perforation, 3 patients had jejunal perforation secondary to blunt abdominal trauma, 8 patients were operated for reversal of ileostomy, and distal gastrectomy was done in 1 patient for stomach cancer (Table 1).

A thorough clinical examination was done in all the patients in the postoperative period to look for the symptoms or signs suggestive of lower respiratory tract infection. Chest radiograph was done in patients who were having complaints of fever with cough, sputum production, rhonchi and crepts or decreased air entry in the lung fields on auscultatory examination.

Sputum specimen was collected and transported immediately to the bacteriology laboratory for inoculation in all the patients who were having respiratory complaints in the postoperative period.

## **Result and Discussion**

Out of the 25 patients included in the study 16 patients (13 patients with peptic ulcer perforation and 03 patients with jejunal perforation) were operated in the emergency setting and 09 patients (08 patients with reversal of stoma and 01 patient with gastric cancer).

Out of the 25 patients included in the study there were surgical complications in the form of leak in 04 patients. This included 2 patients with peptic ulcer perforation, 1 patient with jejunal perforation and 1 patient with reversal of ileotomy. Ryles tube was removed after 48 hours in all the patients but it was reinserted in these 04 patients.

The two patients with peptic ulcer perforation who developed leak were kept nil oral by mouth along with nasogastric suction and total parenteral nutrition was advised. The patient with jejunal perforation who developed leak was re-operated and anastomosis was done along with nasogastric suction and total parenteral nutrition was advised. One patient with ileostomy who developed leak was operated again and stoma was made again, Ryles tube was kept for 48 hours and removed when stoma became functional after another 48 hours.

Out of the 25 patients included in the study 06 patients developed respiratory complaints but radiograph of the chest was suggestive of pneumonia in 3 patients including 2 patients with peptic ulcer perforation with leak and 01 patient with jejunal perforation with leak. One patient with peptic ulcer perforation succumbed to the respiratory complications and expired on the 6<sup>th</sup> postoperative day.

Sputum culture was done in all of the 06 patients who developed respiratory complaints and it was negative in 03 patients. The two patients with peptic ulcer perforation who developed leak showed the growth of *Escherichia coli* and the one with jejunal perforation secondary to blunt abdominal trauma showed the growth of *Klebsiella pneumoniae*.

Use of Ryles tube for nasogastric decompression is widely practised after any

sort of gastrointestinal surgery. The practice is based largely on tradition and the perception that nasogastric decompression protects patients from postoperative complications like nausea, vomiting, aspiration pneumonia, wound complications and anastomotic leakage. However the inadvertent use of Ryles tube has led to several problems and one of the most common complications is micro-aspiration pneumonia. Several studies report against the routine practice of Ryles tube insertion that would not be advocated by most surgeons today. Thus the foundation on which nasogastric decompression is based has changed over the past several decades, necessitating a re-evaluation of its use.

In our study short duration (<48 hours) use of Ryles tube was not associated with any pulmonary complications but patients in whom the Ryles tube was kept for longer duration because of surgical complications there was higher incidence of pneumonia. In 4 out of 25 patients there were surgical complications in the form of leak from the anastomotic site. These included 2 patients with peptic ulcer perforation, 1 patient with jejunal perforation and one patient in which ileostomy closure was done.

The 2 patients with peptic ulcer perforation were kept on conservative management with nasogastric suction along with total parenteral nutrition (Table 2). In both of these patients the discharge from the main wound decreased with this conservative management but both of them developed fever, cough and breathlessness on 5<sup>th</sup> postoperative day. Radiograph of the patient was suggestive of bilateral fluffy infiltrates which were not present initially. Sputum culture was done which suggested the growth of *Escherichia coli*. Thus the diagnosis of micro-aspiration pneumonia was made. One of the patient with peptic ulcer perforation succumbed to the

pulmonary complications on the 6<sup>th</sup> postoperative day. In the other patient with peptic ulcer perforation Ryles tube was removed and there was gradual improvement. One of the three patients with jejunal perforation secondary to blunt trauma abdomen developed leak from the anastomotic site on 3<sup>rd</sup> postoperative day. The patient was re-operated and anastomosis was done and he was kept on conservative management with Ryles tube suction and total parenteral nutrition. The patient developed fever with cough and expectoration 72 hours later and radiograph of the chest was suggestive of bronchopneumonia. Sputum culture was done which showed the growth of *Klebsiella pneumoniae*.

There was anastomotic leak in one patient in whom stoma closure was done. The patient was re-operated and recovery was good so the Ryles tube was removed within 48 hours.

Our study is supported by several other studies. Ghani Soomro *et al.* (2008) in their study on 70 patients concluded that routine nasogastric decompression should not be done in patients undergoing laparotomy. Only 5.7% of the patients in their study required insertion of Ryles tube postoperatively. They also concluded that routine use of Ryles tube is associated with higher chances of pulmonary complications and there is also a persistent sense of irritation and foreign body in the throat.

Huerta *et al.* (2002) did a study on 1067 patients of morbid obesity in whom gastric bypass was done. They concluded that postoperative nasogastric decompression had no effect on the rate of complications. They also concluded that use of nasogastric tube is associated with higher incidence of pneumonia.

Cheatham and Chapman (1995) did a meta-analysis of 26 clinical trials including 3964 patients comparing the routine use of nasogastric tube versus selective nasogastric decompression after elective laparotomy. They concluded that routine use of nasogastric tube results in a significantly increased incidence of pulmonary complications (fever, atelectasis, and pneumonia) and does not decrease the incidence of wound complications (infection and dehiscence). They also concluded that through the use of selective nasogastric decompression after elective laparotomy, at least 20 patients can be spared the discomfort of a nasogastric tube for every patient who requires decompression.

Argov *et al.* (1980) did a study on 300 patients with upper abdominal surgery. One hundred fifty patients were treated by insertion of a nasogastric tube, and 150 patients were treated without it. The incidence of postoperative pneumonia was 10 times higher in the patients treated with a nasogastric tube. Pneumonia was directly related to the patient's age and the duration of the tube's use. It should be reserved as a tool for treating postoperative complications such as paralytic ileus and acute gastric dilatation.

El-Solh *et al.* (2001) did a study on 95 institutionalized patients with severe aspiration pneumonia, to know the microbial etiology. Out of the 67 pathogens identified, Gram-negative enteric bacilli were the predominant organisms isolated (49%), followed by anaerobic bacteria (16%), and *Staphylococcus aureus* (12%). This is also consistent with our study in which *Escherichia coli* was isolated from two patients and *Klebsiella pneumoniae* was isolated from the other patient.

**Table.1** Patients included in the study with diagnosis and type of surgery

S. no	Diagnosis of the patient	Number of patients	Nature of surgery Emergency or elective
1.	Peptic ulcer perforation	13	Emergency
2.	Jejunal perforation secondary to blunt abdominal	03	Emergency
3.	Reversal of stoma	08	Elective
4.	Distal gastrectomy for stomach cancer	01	Elective

**Table.2** Number of patients who developed surgical complication along with procedure done and duration of Ryles tube insertion

S. no.	Diagnosis	Number of patients	Procedure done	Duration of Ryles tube insertion
1.	Peptic ulcer perforation with leak	02	Conservative management	1 <sup>st</sup> patient-06 days 2 <sup>nd</sup> patient- 09 days
2.	Jejunal perforation with leak	01	Operative intervention	03 days
3.	Reversal of stoma with leak	01	Operative intervention	02 days

### Limitations of study

The study has been done in only 25 patients so the sample size is small.

The better method of collecting the sample is bronchoalveolar lavage, in our study we used sputum for the culture of the organism.

In conclusion, routine and prolonged use of Ryles tube for nasogastric suction is associated with a significantly higher incidence of microaspiration pneumonia. Nasogastric suction should be done only in selected group of patients who develop postoperative abdominal distension or paralytic ileus. Gram negative organisms are the most common organisms involved in microaspiration pneumonia through the nasogastric tube.

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