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Aerophagia During Non-Invasive Ventilation: Preventive and Corrective Management Strategies for Better Patient Outcomes

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Abstract: ***Introduction**: Aerophagia is a frequent but underappreciated complication of non-invasive ventilation (NIV). It can cause discomfort and compromise treatment effectiveness. This study presents a case series of 77 patients, highlighting clinical features and practical strategies for prevention and management. **Materials and Methods**: A prospective case study was carried out at Citizens Specialty Hospital, Hyderabad, including 77 patients who developed aerophagia following NIV. Diagnostic evaluation involved clinical examination, laboratory investigations, and imaging. **Results**: All patients were treated conservatively without surgery. Management strategies included bowel rest, nasogastric decompression, fluid therapy, and supportive care. **Conclusion**: Aerophagia related to NIV can be successfully managed with conservative approaches, avoiding the need for surgical intervention.*

Keywords: Aerophagia, NIV, etiologies, management strategies

1. Introduction

Non-invasive ventilation (NIV) is widely recognized as an effective intervention for patients with acute and chronic respiratory failure. Compared with invasive ventilation, it decreases the need for intubation, lowers complication rates, and reduces hospital stay. However, NIV is not without side effects. One often overlooked complication is aerophagia, the swallowing of excess air that accumulates in the gastrointestinal tract.

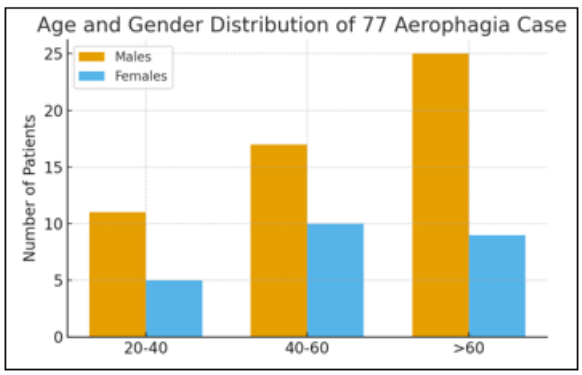
Aerophagia typically results from positive pressure ventilation forcing air into the esophagus, particularly in the presence of high inspiratory pressures, mask leaks, or poor patient–ventilator coordination. Clinical consequences range from mild bloating to severe gastric distension, nausea, vomiting, and aspiration, which may compromise patient tolerance. This risk is higher in those with COPD, neuromuscular weakness, or impaired consciousness.

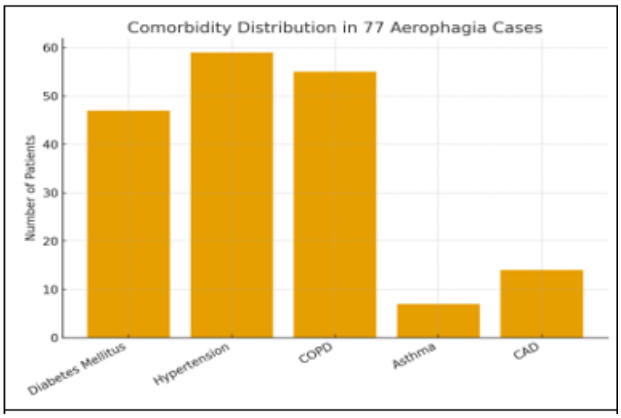
Early recognition and timely intervention are essential. Management strategies include adjustments to ventilator settings, ensuring mask fit, repositioning the patient, and gastric decompression. Pharmacological or procedural measures may be necessary in persistent cases. Addressing aerophagia promptly can enhance patient comfort, improve adherence, and optimize NIV outcomes.
Typical clinical features include abdominal bloating/ distension, epigastric pain/fuller stomach sensation, belching, and sometimes nausea or vomiting.

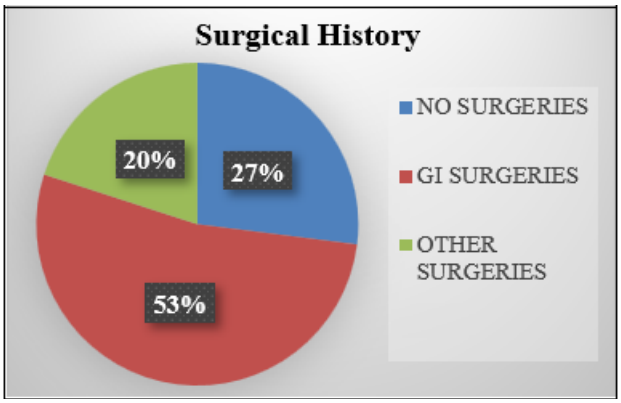
Imaging, especially CT scans and X- ray Erect Abdomen, is essential for diagnosis and treatment planning. This Study includes case series of 77 patients developed aerophagia as a complication following NIV and managed conservatively.

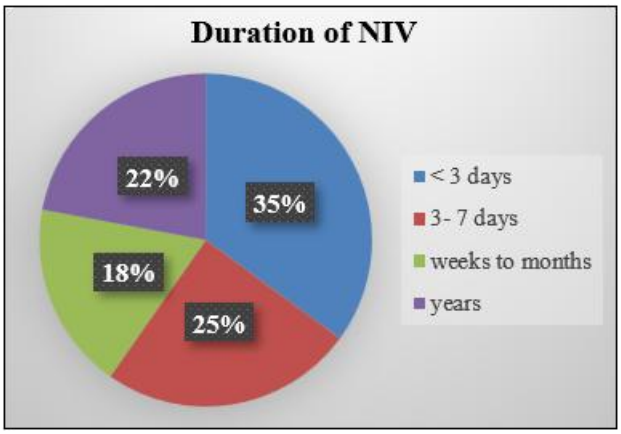
2. Case Series

This study involved 77 patients who developed aerophagia following NIV. Symptoms included abdominal bloating, distension, colicky pain, nausea, vomiting, and absence of flatus or stool. Clinical evaluation consisted of detailed history-taking, physical examination, and laboratory tests such as complete blood counts and electrolyte panels. Imaging with abdominal X-rays and CT scans was performed to rule out obstruction or ischemia.



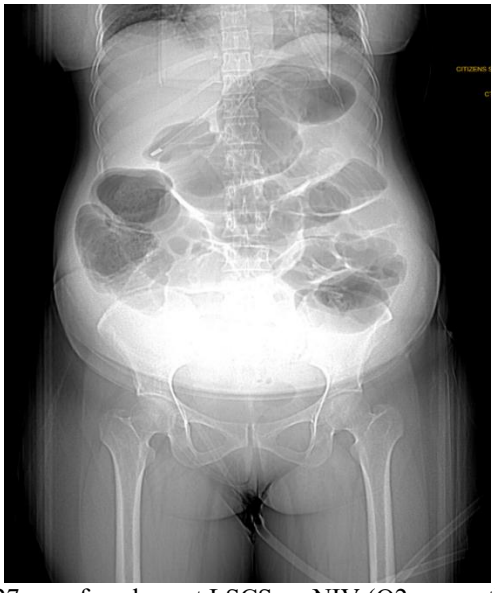






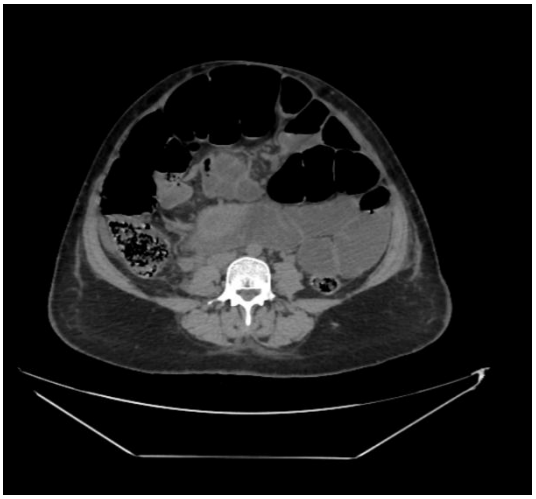
All patients were kept nil per oral (NPO). Nasogastric tubes were inserted for decompression, with aspirates monitored closely. Patients were encouraged to ambulate, and enemas were administered when necessary for fecal impaction. Intravenous fluids corrected dehydration and electrolyte imbalance. Serial radiographs were used to monitor progress. Prokinetic agents such as levosulpiride or prucalopride were given in cases with delayed motility. A combination of simethicone and activated charcoal was used for symptomatic relief. Once recovery was evident, the nasogastric tube was removed and diet was advanced gradually. Oral intake was gradually resumed, starting with clear liquids and progressing to a soft diet as tolerated.

3. X- Rays and CT- Scan

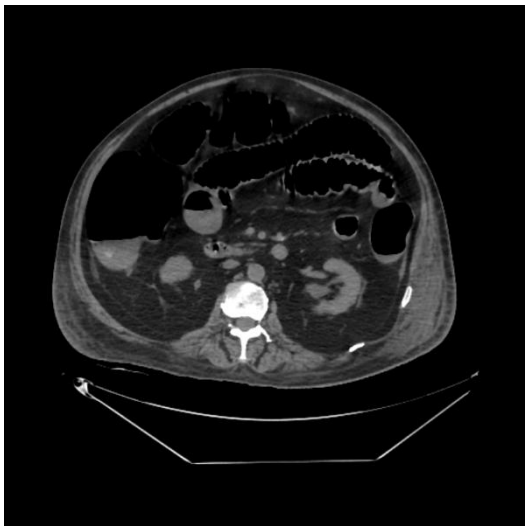


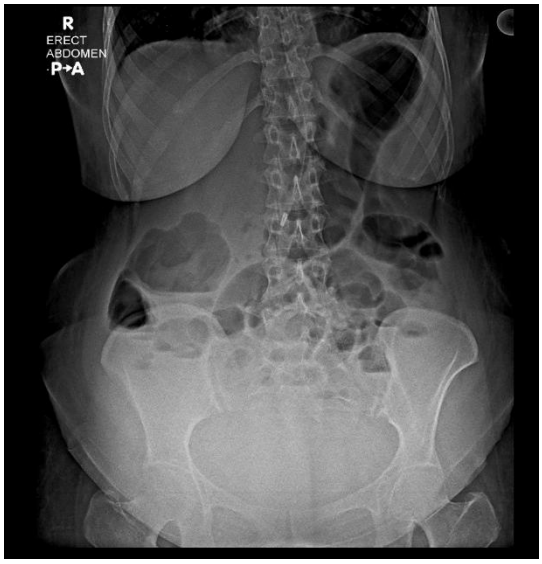
27 year female post LSCS on NIV (O2 support)

66 yr old male k/c/o COPD on NIV (CPAP)



CT Showing Dilated Bowel loops with air





X Ray erect abdomen on day-2 following management

X ray Erect abdomen on day-3 following management

4. Discussion

Aerophagia refers to excessive swallowing of air, leading to accumulation of gas within the gastrointestinal tract, most often in the stomach. Unlike normal, minor air intake during eating or talking, this condition produces distressing symptoms such as abdominal distension, belching, and discomfort.

Diagnosis typically requires:

- New or worsening symptoms such as bloating or belching after initiation of NIV.
- Radiological evidence of excess gas in the gastrointestinal tract without air fluid levels.
- Clear temporal association with NIV use or other risk factors.
- Exclusion of alternative gastrointestinal disorders.
- Symptom relief following interventions such as ventilator adjustment or gastric decompression.

Role of CT in Diagnosing Aerophagia:

1) ***Marked intraluminal gas:*** Abnormal accumulation of gas in the stomach, small intestine, and/or colon
2) ***No evidence of mechanical obstruction:*** No transition point, collapsed distal bowel, or obstructing mass
3) ***No bowel wall thickening or edema:*** Helps rule out inflammatory or ischemic bowel disease
4) ***Absence of pneumatosis or free air:*** Confirms that gas is intraluminal and not due to perforation or necrosis
5) ***Uniform, symmetric distension:*** Bowel distension is proportional and not localized (i.e., not a closed loop or segmental process)
6) ***Normal wall enhancement:*** No compromised vascularity or ischemia
7) ***No fluid levels (or minimal):*** Suggests gas accumulation is not due to bowel stasis or obstruction

In our study, recognition and conservative treatment of aerophagia proved sufficient. Key strategies included optimizing ventilator pressures, ensuring a proper mask seal, using nasogastric decompression, and maintaining hydration and electrolyte balance. Prokinetic and antiflatulent agents were useful adjuncts. These interventions improved tolerance to NIV and prevented the need for invasive procedures.

While our approach was successful, it's important to acknowledge alternative strategies that might be beneficial in different contexts. For instance, pharmacological interventions using prokinetic agents or antifoaming agents like simethicone can be considered when conservative measures alone are insufficient.

5. Limitations and Future Directions

This study was limited by its focus on a single institution and the absence of a control group. Future research could explore the effectiveness of different management protocols across diverse populations and settings. Additionally, investigating the impact of NIV settings on the incidence of aerophagia could provide insights into preventive strategies.

6. Conclusion

Effective recognition and timely management of aerophagia are vital to improving outcomes during NIV therapy. This study shows that conservative strategies can resolve symptoms preventing negative Laparotomy or Diagnostic Laparoscopy, thereby improving patient comfort and adherence to treatment.

References

[1] https://archbronconeumol.org/en-aerophagia-due-noninvasive-mechanical-ventilation-articulo-13046508
[2] https://jcsm.aasm.org/doi/full/10.5664/jcsm.27278
[3] https://www.researchgate.net/profile/Gaetano-Iapichino/publication/258954574_Aerophagia_increases_the_risk_of_ventilator-associated_pneumonia_in_critically-ill_patients/links/53eb69730cf23b8116a9bccb/Aerophagia-increases-the-risk-of-ventilator-associated-pneumonia-in-critically-ill-patients.pdf?__cf_chl_tk=7CNJtgyK6lgR52I728xIkHjkmWUrUzG43gPrvn8j9dI-1757601998-1.0.1.1-QGG_IzdHJBWJcBZQhEaemL7.lbzk1hPWInRX4LOy96A
[4] https://www.sciencedirect.com/science/article/abs/pii/S1542356512010476
[5] https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1365-2036.2005.02651.x
[6] https://link.springer.com/article/10.1007/s11938-006-0012-9
[7] https://www.scielo.br/j/rpp/a/sqCbTmYYDJs5PqnXZbs93mn/?lang=en