



# Same day discharge is safe and feasible following POEM surgery for esophageal motility disorders



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## Abstract

**PURPOSE:** The perioperative care of patients undergoing Per-Oral Endoscopic Myotomy (POEM) involves admission and routine esophagogram prior to discharge. This study aims to establish the safety and feasibility of same day discharge following POEM.

**METHODS:** Retrospective analysis of prospectively collected data for patients undergoing POEM during 6 years at a single institution in Ontario, Canada. Patients were discharged home on the same day with controlled pain, when tolerating clear fluids, or admitted if clinically indicated. We shifted from routine post-POEM esophagography to only imaging patients if clinically indicated.

**RESULTS:** Out of 90 successful POEM procedures, 72 patients (79.1%) were discharged on the same day, 14 patients (15.4%) on POD 1, and 5 patients (5.5%) discharged on POD2 or more. Amongst these, there were only 8 (8.8%) unplanned admissions. 53 patients underwent routine esophagography but no leaks were identified. One POEM was unsuccessful, and there was one esophageal leak, identified clinically. There were 7 re-admissions within 90 days, 5 for POEM-related issues. Our mean Eckhardt score at 2 weeks was 2.1 from 7.2 pre-operatively.

**CONCLUSION:** This study establishes that same day discharge is both safe and feasible following POEM and suggests that esophagography should be performed only when clinically indicated.

## Introduction

Per oral endoscopic myotomy (POEM) has been increasingly used to treat achalasia over laparoscopic Heller myotomy (LHM), the current gold standard treatment. POEM continuously and consistently demonstrates comparable clinical, manometric, and functional efficacy to LHM, with little morbidity and no reported mortality. A safety and feasibility pilot study was conducted at our institution and published in 2015.

Recent published clinical practice guidelines by *Inoue et al.* for POEM perioperative care include upper GI endoscopy and esophagography prior to attempting oral diet and discharge. However, since the procedure is generally well tolerated, there is a shift towards shorter length of stay (LOS) after POEM. Despite conflicting data, with some studies showing similar LOS between POEM and LHM in the range of 3-5 days, shorter hospital stays for POEM compared to LHM continue to be reported. *Bhayani et al.* even reported some same day discharges from POEM, following normal post-operative contrast esophagography. Esophagography is done routinely to evaluate the risk of perforations and esophageal leaks, which have been demonstrated as being quite low. It's utility to predict adverse events has been showed to be limited, and therefor it's role as a routine test after POEM has recently been questioned. In May 2019, *Benias et al.* reported that 62.4% of their patients were safely discharged on the same day after POEM, with esophagography only performed if clinically indicated. Although emerging, the evidence remains limited to recommend this practice.

Therefore, our primary objective was to review the feasibility and safety of same-day discharge following a POEM procedure at our institution.

## Methods

This is a single-institution prospective case series including patients undergoing POEM from March 2013 to July 2019 by two experienced POEM-trained surgeon. Exclusion criteria were non-elective POEM procedure, contraindication to general anesthesia, pregnancy or lactation, hiatal hernia (>2 cm). Previous treatments such as previous LHM, POEM, endoscopic dilation, botox injection were not exclusion criteria. Preoperatively data from Eckhardt score, esophageal manometry, barium swallow, upper endoscopy, and 24-hour pH was collected when feasible. Surgical variables such as myotomy length, tunnel length, operative time and number of clips used were recorded. Patients were followed postoperatively in the same-day surgery unit, and discharged when tolerating clear fluids, with controlled pain on regular acetaminophen. Post-operative esophagography was initially carried out routinely, but given that no clinically significant gastrograffin leaks were identified, our center ceased using esophagography routinely starting August 2017.

## Results

Table 1 – Preoperative patient characteristics

|                                    | Mean or Number / (%) or [Median, IQR] |
|------------------------------------|---------------------------------------|
| Number of patients                 | 91                                    |
| Female                             | 49 (53.8)                             |
| Male                               | 42 (46.1)                             |
| Age (years)                        | 53.9 [56, 42 – 66]                    |
| Diagnosis                          |                                       |
| Achalasia                          | 86 (94.5)                             |
| Jackhammer esophagus               | 3 (3.3)                               |
| Hypertensive LES post-RYGB         | 2 (2.2)                               |
| Previous Treatments                |                                       |
| None                               | 53 (58.2)                             |
| Balloon Dilatation                 | 22 (24.2)                             |
| Botulinum toxin injection          | 9 (9.9)                               |
| Laparoscopic Heller myotomy        | 5 (5.5)                               |
| Previous POEM                      | 3 (3.3)                               |
| Calcium channel blocker            | 3 (3.3)                               |
| Fundoplication                     | 2 (2.2)                               |
| Roux-En-Y gastric bypass           | 2 (2.2)                               |
| Nitrates                           | 2 (2.2)                               |
| Billroth II                        | 1 (1.1)                               |
| Combination of procedures          | 11 (12.1)                             |
| Preoperative Eckhardt score (n=69) | 7.2 [8, 5 – 10]                       |
| LES resting pressure (n=78)        | 39.5 [37.0, 25.9 – 51.3]              |
| LES residual pressure (n=77)       | 26.1 [22.7, 17.3 – 32.1]              |
| ASA Classification                 |                                       |
| 1                                  | 1 (1.1)                               |
| 2                                  | 23 (26.4)                             |
| 3                                  | 46 (52.9)                             |
| 4                                  | 17 (19.5)                             |

Patient pre-operative characteristics, including their diagnosis and previous treatments (if any), manometric measurements and ASA scores are shown in **Table 1**. Most patients had a diagnosis of achalasia (94.5%) and a significant portion of (41.8%) had previous treatments for their dysmotility disorder, including previous LHM and POEM. In terms of preoperative severity of achalasia, the mean Eckhardt score was 7.2.

The technical details of the procedure as well as the intraoperative adverse events (AE) are reported in **Table 2**. All patients underwent successful POEM, except 1 where the procedure was aborted due to esophagitis severity. A total of 15 (16.4%) patients had intraoperative AEs. These were managed successfully. All but one of these patients were discharged on the same day, contributing 1 patient to our unplanned admissions.

A total of 72 (79.1%) patients were discharged on the same day, while 19 (20.5%) patients were admitted. Of those admitted, 14 (15.4%) patients were discharged on POD 1, whereas 5 patients (5.5%) had a length of stay greater or equal than 2 days. Including intraoperative AEs, a total of 22 patients (24.2%) had a form of perioperative adverse event, with 7 (7.7%) post-operative adverse events, for a total of 8 unplanned admissions (8.8%). All but 2 patients with unplanned admission were discharged on POD 1. There were no deaths or morbidities among our patients. We had one leak in this cohort, with a LOS of 55 days, requiring a feeding tube.

Within 90 days post-procedure, 10 patients (11.0%) presented to the ED and of those, 7 (7.7%) were re-admitted to hospital, 5 for POEM related issues. 3 had hematemesis, of which 2 were on anticoagulation, all with grossly normal EGDs, and 2 had feeding intolerance, 1 requiring feeding tube and eventual re-do POEM. 2 other patients required re-do POEM procedure for recurrent dysphagia 2 and 4 years after their initial procedure. At the 2-week post-operative mark, the mean Eckhardt score was 2.1.

53 patients had routine post-operative esophagography. No leaks were identified, but 8 studies were abnormal, leading to 1 unplanned admission until POD4. The esophageal leak was identified clinically then confirmed on esophagography.

### Length of stay after POEM

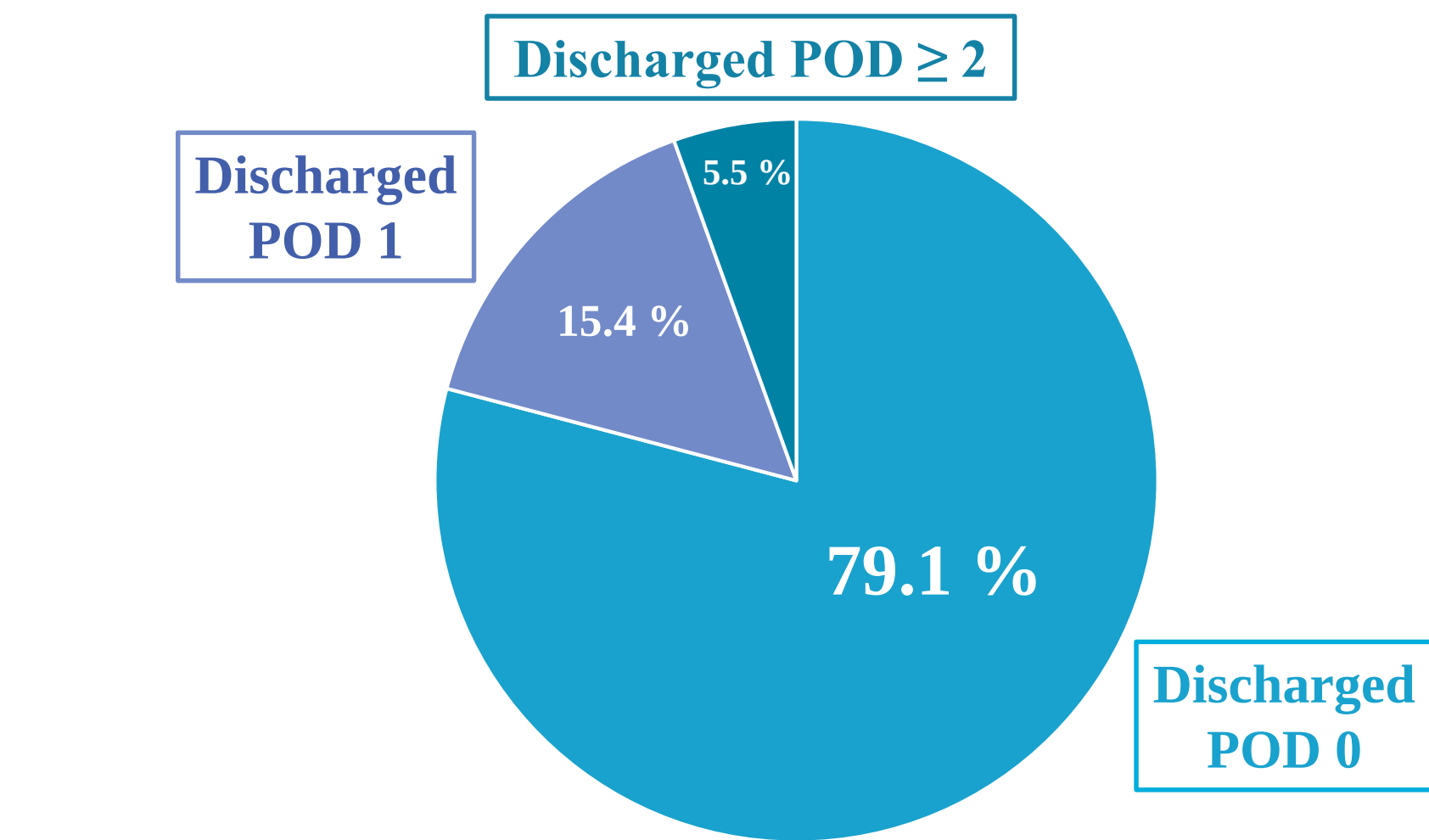


Table 2 – POEM operative experience

|                                    | Mean or Number ± SD (%) |
|------------------------------------|-------------------------|
| Completed operations               | 90                      |
| Operating time, minutes (n=83)     | 86.2 ± 38.4             |
| Tunnel length, cm (n=87)           | 14.4 ± 3.5              |
| Myotomy length, cm (n= 87)         | 11.9 ± 3.3              |
| Number of clips (n= 87)            | 6.7 ± 2.6               |
| No intraoperative AE               | 75 (82.4)               |
| Intraoperative AE                  | 15 (16.5)               |
| Capnoperitoneum with decompression | 7 (7.7)                 |
| Mucosal defect requiring clips     | 6 (6.5)                 |
| Bleeding controlled with cautery   | 2 (2.2)                 |

## Discussion

In this study of 91 patients undergoing POEM, 79.1% were discharged on the same day of the procedure. Another 15.4% of patients were discharged on POD1, for a total of 94.5% discharged within 1 day of admission. 6 of our 8 unplanned admissions were discharged on POD1. Combined with the findings from the recent *Benias* study, our results suggest that same day discharge is feasible for POEM. This is a significant shift from the recent meta-analysis from both *Awaiz* (average 4.2 to 1.1 days) and *Schlottmann* (average 9.3 to 1.0 days).

Our overall rate of perioperative AEs was high at 24.2%, but likely related to a broader definition of AE given our new same day discharge standard. Our 16.5% intraoperative AE rate did not contribute to prolonged admission, with only one patient subsequently admitted and discharged on POD1. Our 2-week post-operative Eckhardt score is adequate but slightly higher than reported in other studies who measured scores at 1 and 2 months. Our low rate of 90 day ED visit and readmission further outlines the feasibility and safety of same-day discharge. Based on the nature and timeline of these presentations, longer LOS would not have altered their clinical course.

Given that no leaks were identified in 53 patients who underwent routine esophagography while part of our protocol, and other identified abnormalities did not alter clinical decision making, we resolved to only perform esophagography when clinically indicated, which we did for 2 patients, one of whom had a clinically diagnosed leak.

Table 3 – POEM post-operative experience

|                                          | Number or Mean / (%) or [Median, IQR] |
|------------------------------------------|---------------------------------------|
| Length of stay (days) and indication     |                                       |
| 0                                        | 72 (79.1)                             |
| 1                                        | 14 (15.4)                             |
| Chest pain                               | 2                                     |
| Oxygen saturation                        | 1                                     |
| Transient atrial fibrillation            | 1                                     |
| Contrast extravasation (flap)            | 1                                     |
| Intraoperative adverse event             | 1                                     |
| ≥ 2                                      | 5 (5.5)                               |
| Esophageal leak, Mediastinitis           | 1                                     |
| Chest pain, slow passage of contrast     | 1                                     |
| Perioperative adverse events             | 22 (24.2)                             |
| Intraoperative AE                        | 15                                    |
| Postoperative AE                         | 7                                     |
| Unplanned admissions                     | 8                                     |
| Mean LOS for patients with AE (days)     | 3.0 [0, 0 – 1]                        |
| 90-day ED visits                         | 10 (11.0)                             |
| 90-day readmission                       | 7 (7.7)                               |
| UGIB                                     | 3                                     |
| Feeding intolerance                      | 2                                     |
| Other                                    | 2                                     |
| Post-operative esophagography            |                                       |
| Total performed                          | 53 (58.2)                             |
| Delayed passage of contrast              | 7                                     |
| Dissections identified on esophagography | 1                                     |
| Leaks identified on esophagography       | 0                                     |
| Leaks identified clinically              | 1                                     |
| Long term outcomes                       |                                       |
| 2-week Eckhardt score (n=66)             | 2.1 [2, 1 – 3]                        |
| Feeding tube insertion                   | 2 (2.2)                               |
| Redo POEM procedure                      | 3 (3.3)                               |

## Conclusion

This study establishes that same day discharge is both safe and feasible following POEM procedure and suggests that esophagography should be performed only when clinically indicated. This represents a shift from the routine practice of admission and imaging for patients undergoing POEM, encouraging the transition to outpatient POEM procedures.

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