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The Effects of Pharyngeal Packing on The Postoperative Gastric Fluid Volume in Patients Undergoing Nasal Surgeries: A Randomized Controlled Double-Blinded Non-Inferiority

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Abstract

Background

Pharyngeal packing is commonly used during nasal surgery to prevent the ingestion of blood or secretions; however, its use lacks clear evidence of clinical benefit and may contribute to postoperative discomfort. This study aimed to evaluate whether omitting pharyngeal packing is non-inferior to using it regarding gastric fluid volume (GFV) at the end of surgery in adults undergoing nasal surgery.

Methods

In this randomized controlled, non-inferiority trial, 116 adult patients scheduled for elective nasal surgery under general anesthesia were randomly assigned to two equal groups: the packing group who received pharyngeal packing after intubation, and the non-packing group who did not. Gastric ultrasonography was performed preoperatively and at the end of surgery to measure antral cross-sectional area (CSA) and calculate GFV using a validated formula. The primary outcome was GFV at the end of surgery. Secondary outcomes included change in GFV, aspiration risk thresholds (1.2 and 0.8 mL/kg), postoperative nausea and vomiting (PONV), throat pain, and lung ultrasound score (LUS).

Results

A total of 116 adults completed the study (58 per group). At the end of surgery, mean (SD) GFV was significantly lower in the non-packing group 48.6 (15.2) mL compared with the packing group 60.9 (23.9) mL, with a mean difference of − 12.35 mL (95% CI: − 19.72 to − 4.97; p = 0.001). The entire confidence interval lay below the 10 mL non-inferiority margin, confirming non-inferiority of the non-packing group. At the end of surgery, more patients in the packing group exceeded the 1.2 mL/kg GFV threshold (12.1% vs. 1.7%, p = 0.03). No cases of pulmonary aspiration occurred. The incidence and severity of postoperative throat pain were markedly greater in the packing group (58.6% vs. 24.1%; p < 0.0001).

Conclusion

Omitting pharyngeal packing in adults undergoing nasal surgery was non-inferior to using packing with respect to gastric fluid volume. Within the limits of this study, omission of pharyngeal packing was not associated with an increase in clinically suspected pulmonary aspiration, while significantly reducing postoperative throat pain and improving patient comfort.

Key points

Does omitting pharyngeal packing during nasal surgeries increase gastric fluid volume at the end of surgery?

Omitting pharyngeal packing was non-inferior to using packing, resulting in lower gastric fluid volumes and less postoperative throat pain, without increasing aspiration risk.

Routine pharyngeal packing during nasal surgeries may be unnecessary; its omission can enhance postoperative comfort without compromising safety.

Introduction

Pharyngeal packing is commonly performed following tracheal intubation during nasal and oral surgeries to reduce perioperative blood ingestion and/or tracheal contamination. Pharyngeal packs theoretically absorb blood and provide a physical barrier preventing blood ingestion thus reducing the incidence of postoperative nausea and vomiting (PONV), however this practice is not based on strong evidence.[1, 2]

Throat pain, trauma and oral ulcers are common complications following throat packing during surgery. Such complications have impact on the sense of patient discomfort after surgery. [3] Furthermore, the rare but catastrophic risk of leaving the pack in place after extubation which can lead to airway obstruction and death. [2, 4]

Therefore, a recent consensus had discouraged the routine use of pharyngeal packing and recommended careful consideration for its use and removal.[2]

Gastric ultrasonography is a non-invasive tool that provides both qualitative and quantitative information about gastric contents. The gastric antrum can be easily examined by the ultrasound, as it has a reliable location and can be readily identified using standard internal anatomical landmarks. Evaluation of antral size can provide an accurate estimate of total gastric content volume.[5, 6]

A previous study investigating the effect of pharyngeal packing on perioperative gastric volume in nasal surgeries suggested that pharyngeal packing may help prevent blood aspiration. [7] However, the evidence remains limited and somewhat conflicting. For instance, a more recent randomized controlled trial found no protective effect of throat packing on intraoperative blood ingestion as measured by gastric suctioning.[8]

In this study, we aim to investigate the effects of pharyngeal packing on the perioperative gastric fluid volume GFV assessed by ultrasound in patients undergoing nasal surgeries.

We hypothesized that omission of pharyngeal packing during nasal surgery is non-inferior to the routine use of pharyngeal packing in terms of perioperative blood ingestion, as assessed by ultrasound guided GFV at the end of surgery.

Methods

This randomized controlled non-inferiority trial was conducted at Cairo University hospital, after the Research Ethics Committee approval, faculty of medicine, Cairo University (MD-420-2023), between April 2025 and August 2025. The trial was registered at clinicaltrials.gov registry system before enrolment of the first participant (NCT06957275, principal investigator: Khaled Sarhan, date of registration: April 26^{th,} 2025). Written informed consent was obtained from all participants before enrolment. The study followed the Consolidated Standards of Reporting Trials (CONSORT) guidelines and the ethical principles outlined in the Declaration of Helsinki.

Eligible adult patients aged 18–60 years, classified as American Society of Anesthesiologists (ASA) physical status I–II and scheduled for nasal surgeries, were randomly assigned to one of two groups using a computer-generated randomization list. Allocation concealment was ensured through the use of sealed, opaque envelopes, which were opened by an anesthesiologist not involved in data collection. Patients in the packing group received pharyngeal packing after tracheal intubation, while those in the non-packing group did not.

Exclusion criteria included: a history of PONV, patient refusal, diabetes mellitus, obesity, gastroesophageal reflux disease, any condition or medication that impairs gastric motility, patients in whom the duration of surgery exceeded 4 hours were excluded from the study, and emergency surgery.

On the day before surgery, all patients were instructed to adhere to institutional fasting guidelines. On the day of surgery, patients arrived at the pre-anesthesia area one hour prior to the procedure. A 20-gauge intravenous cannula was inserted, and prophylactic ondansetron (8 mg) was administered intravenously as an antiemetic premedication.

Preoperative ultrasonographic qualitative and quantitative assessments of the gastric antrum were performed and recorded by a trained, experienced anesthesiologist who had completed supervised training in both gastric and lung ultrasound assessments in more than 50 patients and was blinded to group allocation. Ultrasonography was conducted using (GE HealthCare Technologies Inc., Chicago, IL, USA), equipped with a 5–2 MHz curved transducer. Patients were scanned first in the supine and then in the right lateral decubitus (RLD) position while maintaining a 45° semi-recumbent posture. The gastric antrum was identified in the sagittal or right parasagittal plane using the left lobe of the liver, pancreas, abdominal aorta, or inferior vena cava as anatomical landmarks.

Qualitative assessment was based on the standard three-grade system: Grade 0, no fluid visible in either supine or RLD positions; Grade 1, fluid visible only in the RLD position; and Grade 2, fluid visible in both supine and RLD positions. Quantitative assessment was performed by measuring the cross-sectional area (CSA) of the gastric antrum between peristaltic contractions using the formula: $\pi \times (D_1 \times D_2) / 4$, where D_1 and D_2 represented the anteroposterior and craniocaudal diameters, respectively. Each value was averaged from three consecutive measurements taken from the outer gastric wall. Gastric volume (mL) was then estimated using the validated Perlas formula:

Volume (mL) = 27 + 14.6 × right lateral CSA (cm^2) – 1.28 × age (years).[6]

Baseline lung ultrasonography was performed by the same blinded anesthesiologist using the same curvilinear probe, and the total LUS was recorded for each patient. The thorax was divided into 12 bilateral lung regions, and aeration was graded from 0 to 3 according to standard lung ultrasound patterns ranging from normal aeration to subpleural consolidation. The total LUS ranged from 0 to 36, with higher scores indicating greater loss of lung aeration.[9]

In the operating room, standard monitoring including electrocardiography, pulse oximetry, non-invasive blood pressure, and capnography (after intubation) was applied. General anesthesia was induced by a second anesthesiologist (unblinded to group allocation) using intravenous propofol (2 mg/kg), fentanyl (2 μg/kg), and atracurium (0.5 mg/kg). After three minutes of mask ventilation, oral tracheal intubation was performed using an appropriately sized cuffed endotracheal tube. Cuff pressure was maintained at approximately 20 cmH_2O using a disposable color-coded airway pressure manometer (Mercury Medical®, Clearwater, FL, USA). Anesthesia was maintained with intermittent positive pressure ventilation using isoflurane (MAC 1–1.5) in an oxygen/air mixture, along with intermittent doses of atracurium (0.1 mg/kg every 20 minutes). Ventilation was adjusted to maintain end-tidal CO_2 between 30 and 35 mmHg.

In the packing group, a soft, moist pharyngeal pack was gently inserted by the attending anesthetist after intubation, with the end positioned entirely within the oral cavity to avoid soft palate injury. The non-packing group did not receive any oropharyngeal packing.

At the end of surgery, the same blinded anesthesiologist repeated the gastric and lung ultrasound evaluation using the previously described protocol. The pharyngeal pack, when present, remained in place throughout the procedure and was carefully removed at the end of surgery before extubation. Gentle oropharyngeal suction under direct vision was performed, followed by reversal of residual neuromuscular blockade with intravenous neostigmine (0.05 mg/kg) and atropine (0.01 mg/kg), and subsequent tracheal extubation.

Upon arrival in the post anesthesia care unit (PACU), patients were continuously monitored for vital signs and oxygen saturation until discharge. The postoperative follow up period extended from PACU admission until discharge from the PACU. PONV and throat pain were assessed during this period. PONV was assessed using a 4-point categorical scoring system: 0 = no nausea or vomiting, 1 = nausea without vomiting, 2 = nausea with vomiting, and 3 = more than two vomiting episodes within 30 minutes. Rescue antiemetic therapy with intravenous ondansetron 0.15 mg/kg was administered for persistent nausea or more than two vomiting episodes. Throat pain was assessed during the PACU stay using a 10-point visual analogue scale (VAS), where 0 indicated no pain and 10 indicated the worst imaginable pain. Postoperative analgesia was standardized for all patients using intravenous acetaminophen 1 g every 6 hours during the first 24 hours. Rescue analgesia was administered according to patient-reported pain severity and was not limited solely to throat pain. Intravenous ketorolac 30 mg was administered if VAS remained > 4 despite baseline analgesia. Persistent pain despite these measures was managed with nalbuphine (2 mg IV bolus). Patients were monitored during the PACU stay for clinical signs suggestive of pulmonary aspiration, including oxygen desaturation, respiratory distress, or new abnormal postoperative lung ultrasound findings. In suspected cases, standard institutional management including airway suctioning, supplemental oxygen, further imaging, and escalation of respiratory support when indicated would have been initiated. Patients were transferred to the ward after achieving a modified Aldrete recovery score ≥ 9.

The primary outcome was GFV measured at the end of the procedure. Secondary outcomes included the change in GFV between the post intubation and end of surgery measurements; the proportion of patients with end of surgery GFV exceeding the predefined thresholds of 1.2 mL/kg and 0.8 mL/kg as indicators of aspiration risk; the incidence of clinically suspected pulmonary aspiration, assessed from PACU admission until discharge and defined by the presence of respiratory symptoms, oxygen desaturation, or new abnormal postoperative lung ultrasound findings; the incidence of PONV and throat pain during the same follow up period; and perioperative lung ultrasound scores measured before induction of anesthesia and at the end of surgery.

Our primary outcome is the GFV at the end of surgery. Sample size calculation was based on data obtained from a pilot study conducted by the same investigators using the same study protocol. In this pilot study, eight patients in the non-packing group, who were excluded from the final analysis, had a mean (SD) GFV of 23.7 (16.1) mL in the right lateral decubitus position at the end of surgery. Assuming no difference between the standard (packing) and experimental (non- packing) treatment and a non-inferiority margin of 10 mL difference, which represented less than 15% of the gastric volume associated with commonly accepted aspiration risk thresholds in adults. A sample size of 114 patients (57 in each group) was calculated to have a study power of 95% and an alpha error of 0.05. Sample size was increased to 120 patients (60 in each group) to compensate for the possible dropouts. The sample size was determined using the Sealed Envelope Ltd. (2012) online power calculator designed for continuous outcomes in non-inferiority trials, available at: https://www.sealedenvelope.com/power/continuous-noninferior/ [Accessed Sun Dec 24 2024].

The Statistical Package of Social Science Software program, version 23 (IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.) and NCSS 11 Statistical Software (2016), (NCSS, LLC. Kaysville, Utah, USA, ncss.com/software/ncss.) were used for all statistical comparisons. Continuous data were summarized as either mean ± standard deviation or median with quartiles, depending on their distribution, and were compared using the independent t-test or the Mann–Whitney test when appropriate. Paired data were evaluated with either the paired t-test or the Wilcoxon signed-rank test as suitable. Categorical data were expressed as counts and percentages and analysed using the Chi-square test or Fisher's exact test, as appropriate. A p-value of less than 0.05 was regarded as statistically significant.

Results

A total of 116 patients undergoing nasal surgeries were randomized equally into two groups: packing group (n = 58) and non-packing group (n = 58). No patients were excluded and all patients were available for final analysis (figure 1). Demographic variables were statistically comparable between groups (table 1).

There was no significant difference in baseline GFV between the non-packing and packing groups (41.65 (13.08) vs. 47.11 (17.3) mL; p = 0.058). However, the baseline antral CSA was significantly lower in the non-packing group compared to the packing group (3.68 (0.87) vs. 4.11 (1.13) cm^2; p = 0.025) (table 2).

At the end of surgery, the mean (SD) GFV was significantly lower in the non-packing group (48.55 (15.2) mL compared to the packing group 60.9 (23.9 mL), yielding a mean difference of –12.35 mL (95% CI: –19.72 to –4.97; p = 0.001). The entire confidence interval fell below the predefined non-inferiority margin of 10 mL, confirming non-inferiority of the non-packing group (figure 2).

After adjustment for baseline antral CSA and baseline gastric fluid volume, the estimated marginal mean (standard error (SE) of GFV was 51.14 (2.05) mL in the non-packing group vs 58.32 (2.05) mL in the packing group, with an adjusted mean difference of −7.18 mL (95% CI: −13 to −1.37; p = 0.016). The upper bound of the 95% confidence interval remained below the prespecified non-inferiority margin of 10 mL, confirming the non-inferiority.

Among patients undergoing FESS, postoperative GFV was 51.1 (18.8) mL in the non-packing group compared with 63.4 (27.7) mL in the packing group (p = 0.05). In turbinectomy procedures, postoperative GFV was 37.5 (20.3) mL versus 54.7

(25.9) mL, respectively (p = 0.037). In septoplasty procedures, postoperative GFV was 30.9 (15.5) mL in the non-packing group compared with 61.5 (21) mL in the packing group (p = 0.003).

Antral CSA increased significantly in both groups at the end of surgery compared to baseline measurements. However, it remained significantly lower in the non-packing group compared to the packing group at the end of surgery (p < 0.0001). GFV normalized to body weight at the end of surgery was also lower in the non-packing group (0.67 (0.22) mL/kg vs. 0.83 (0.35) mL/kg; p = 0.003) (table 2).

At baseline, the frequency of patients exceeding the GFV thresholds of 1.2 mL/kg and the more conservative 0.8 mL/kg were comparable between the packing and non-packing groups {3.4% vs. 0%, p = 0.25, and 22.4% vs. 12.1%, p = 0.14, respectively}. At the end of surgery, the proportion of patients exceeding the 1.2 mL/kg threshold was significantly higher in the packing group compared to the non-packing group {12.1% vs. 1.7%; p = 0.03}. For the 0.8 mL/kg threshold, the difference between groups was not statistically significant {48.3% vs. 31%; p = 0.06} (table 2).

There were no statistically significant differences in qualitative antral grades between groups at either time point.

There were no statistically significant differences in median lung ultrasound scores between the groups at either time point. No cases of perioperative pulmonary aspiration were documented.

The incidence of PONV in the PACU was comparable between groups {3.4% in the non-packing group vs. 8.6% in the packing group, p = 0.44}. The packing group reported a higher incidence of postoperative sore throat {58.6% vs. 24.1%, p < 0.0001}, with greater median pain scores on leaving the PACU {2 (0–7) vs. 0 (0–5), p < 0.0001} compared to the non-packing group (table 3).

Discussion

Contrary to the traditional assumption that pharyngeal packing during nasal surgery prevents gastric fluid accumulation by blocking the passage of blood and secretions into the stomach, our results demonstrated the non-inferiority of omitting the throat pack. The absence of a throat pack did not increase gastric fluid volume and was, in fact, associated with lower mean values at the end of surgery. These findings are consistent with previous evidence suggesting that throat packs do not completely prevent the passage of blood into the stomach during nasal surgery.[8]

Collectively, these observations support the safety of the non-packing approach and suggest that routine throat packing may not provide additional benefit in preventing gastric distension during anesthesia. Although the packing group demonstrated a significantly larger baseline antral CSA before induction, this likely reflects a chance imbalance following randomization. Importantly, antral CSA was not the primary study outcome; the primary clinically relevant outcome was GFV, which did not differ significantly between groups at baseline.

Our findings differ from those of previous studies that reported higher GFV in the non-packing group.[7, 10] Differences in ultrasound technique, operator experience, and patient positioning may account for these inconsistencies. For example, Temel et al.[7] performed measurements in the supine position, which is not validated in the Perlas model.[11, 12]Additionally, the relatively high rate of non-visualization of the stomach reported in their study exceeds that typically described in the literature and may indicate methodological variability or limited standardization of the ultrasound technique.[6, 11] While Altun et al.[10] lacked assessor blinding and relied solely on quantitative gastric volume calculations, without incorporating qualitative antral grading, which is recommended in current international guidelines for comprehensive gastric assessment.[12–14] In our study, both quantitative and qualitative assessments were performed by a single blinded anesthesiologist, ensuring methodological consistency. The higher GFV observed in the packing group may, at least in part, reflect baseline differences rather than a true physiological effect. However, exploratory subgroup analysis demonstrated consistently lower postoperative GFV in the non-packing group across different surgical subtypes, including FESS, suggesting that the primary findings were unlikely to be solely explained by differences in procedure distribution. Importantly, our trial was designed to assess the non-inferiority of omitting pharyngeal packing rather than to establish superiority, supporting the

safety and adequacy of the non-packing approach without evidence of increased gastric fluid accumulation. Furthermore, Powell et al.[8] reported direct intraoperative suctioning of gastric contents revealed the presence of blood in both groups, indicating that the throat pack may not serve as a completely effective barrier against the passage of blood into the stomach and further supporting the non-inferiority of omitting pharyngeal packing.

Although throat packs have been proposed to reduce PONV, we observed no significant difference between groups, consistent with recent meta-analyses that have not demonstrated a clear benefit. [15–17]

Pain scores and the incidence of postoperative sore throat were significantly higher in the packing group, consistent with evidence that throat packs contribute to pharyngeal trauma, mucosal irritation, and postoperative discomfort. [1, 16] In addition, retained throat packs, although rare, have been associated with life-threatening complications, including airway obstruction and cardiac arrest, as highlighted by the National Audit Project (NAP4). [4]

Based on the aforementioned risks and the lack of proven benefits, the 2018 consensus guidelines issued by the Difficult Airway Society (DAS), British Association of Oral and Maxillofacial Surgery (BAOMS), and ENT-UK [2] strongly discourage the routine use of throat packs and recommend their selective use only when the anticipated benefits outweigh the potential risks. Our findings provide further evidence supporting this recommendation.

This trial has some limitations. First, it was conducted at a single center, which may limit generalizability. Second, although operative duration and overall surgical exposure were comparable between groups, intraoperative irrigation volume and blood loss were not quantified and may have influenced gastric fluid measurements across different surgical subtypes. Third, a baseline difference in antral cross-sectional area was observed between groups despite randomization; however, no significant difference was detected in baseline gastric fluid volume, the primary outcome of the study. Finally, correlation with definitive clinical outcomes such as pulmonary aspiration was limited by the low incidence of aspiration events and the short postoperative follow-up period.

Conclusion

Omitting pharyngeal packing in adults undergoing nasal surgery was non-inferior to using packing with respect to gastric fluid volume. Within the limits of this study, omission of pharyngeal packing was not associated with an increase in clinically suspected pulmonary aspiration, while significantly reducing postoperative throat pain and improving patient comfort.

Abbreviations

CSA
cross-sectional area
GFV
gastric fluid volume
LUS
lung ultrasound score
PACU
post-anesthesia care unit
PONV
postoperative nausea and vomiting
RLD
right lateral decubitus.

Declarations

The authors certify that the work has not been published previously, it is not under consideration for publication elsewhere; it does not duplicate or overlap other published work; and, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. The authors will take public responsibility for the contents

All authors have contributed substantially to the drafting and have approved the final version; and the responsible authorities where the work was carried out had approved the publication.

The lead author affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

The authors declare that they have no conflict of interest with this work and did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of interests:

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Author Contribution

K.S: this author helped in conception of the idea, analysis of the data, and drafting the manuscript.F. M: this author helped in performance of all gastric and lung ultrasound measurements.J. K: this is the senior author who helped in supervision the whole research.N.A: This author helped in writing and revising the manuscript.R.W: this author helped in data collection and analysis.A.T: this author helped in data collection and analysis.D.M: this author helped in drafting the manuscript.A.H: this author helped in drafting the manuscript.

Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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Tables

Table (1): Patients' demographics and operation characteristics:

Demographic and surgical data	Non-packing (n=58)	Packing (n=58)
Age (years)	29.3 (6.19)	31.36 (8.07)
Gender (male)	32 (55.2%)	29 (50%)
Weight (kg)	73.9 (8.75)	75.3 (9.8)
Duration of fasting (hours)		
Solids	9.19 (1.08)	9.28 (0.76)
Fluids	8.03 (1.8)	7.98 (1.66)
Type of surgery (%)		
FESS	24 (41.4%)	33 (56.9%)
Turbinectomy	26 (44.8%)	15 (25.9%)
Septoplasty	8 (13.8%)	10 (17.2%)
Size of cuffed ETT (mm) (%)		
6.5 mm	6 (10.3%)	5 (8.6%)
7 mm	21 (36.2%)	24 (41.4%)
7.5 mm	8 (13.8%)	9 (15.5%)
8 mm	23 (39.7%)	20 (34.5%)
Duration of surgery (hours)	2.09 (0.81)	2.08 (0.69)

Data expressed as mean (SD) or frequency (%).

Abbreviations: FESS functional endoscopic sinus surgery.

Table 2: Gastric fluid volume, antral cross-sectional area measurements, antral grading, and aspiration risk assessment, data are presented as mean (SD), mean (standard error (SE) or frequency (%).

	Non-packing (n=58)	packing (n=58)	P-value
Antral CSA (cm2)			
Baseline	3.68 (0.87)	4.11 (1.13)	0.025*
At the end of operation	4.04 (1.00) †	5.03 (1.67) ‡	<0.0001*
Unadjusted GFV (mL)			
Baseline	41.65 (13.08)	47.11 (17.3)	0.06
At the end of operation	48.55 (15.23) †	60.9 (23.9) ‡	0.001*
Adjusted GFV (mL)			
Baseline	44.27 (0.75) [a]	44.49 (0.75) [a]	0.83
At the end of operation	51.14 (2.05) [a]	58.32 (2.05) [a]	0.02*
GFV at the end of procedure (mL) stratified by surgical subtype:			
FESS			
Turbinectomy	51.1 (18.8)	63.4 (27.7)	0.05
Septoplasty	37.5 (20.2)	54.7 (25.9)	0.04*
	30.9 (15.5)	61.5 (21)	0.003*
GFV (mL/kg)			
Baseline	0.55 (0.21)	0.65 (0.3)	0.47
At the end of operation	0.67 (0.2) †	0.83 (0.35) ‡	0.003*
Qualitative antral grade (baseline)			0.18
Grade 0	36(62%)	29(50%)	
Grade 1	21(36.2%)	29(50%)	
Grade 2	1(1.7%)	0(0%)	
Qualitative antral grade (end of operation)			0.13
Grade 0	17(29.3%)	8(13.8%)	
Grade 1	27(46.6%)	33(56.9%)	
Grade 2	14(24.1%)	17(29.3%)	
At risk stomach (1.2 mL)			
Baseline	0(0%)	2(3.4%)	0.25

At the end of operation	1(1.7%)	7(12.1%)	0.03*
At risk stomach (0.8mL)			
Baseline	7(12.1%)	13(22.4%)	0.14
At the end of operation	18(31%)	28(48.3%)	0.6

* Denotes statistical significance between groups. [a] Data are presented as mean (SE). Between-group comparisons were adjusted using analysis of covariance (ANCOVA). † Denotes statistical significance in non-packing group compared to base line and ‡ Denotes statistical in packing group compared to base line.

Abbreviations: CSA: cross sectional area, GFV: gastric fluid volume.

Table 3: Lung ultrasound scores and postoperative adverse events, data are presented as frequency (%) or median (minimum-maximum).

	Non packing (n=58)	Packing (n=58)	P value
LUS (baseline)	0 (0–2)	0 (0–2)	0.06
LUS (end of operation)	0 (0–2)	0 (0–2)	0.06
Pulmonary aspiration	0 (0%)	0 (0%)	1
PONV	2 (3.4%)	5 (8.6%)	0.44
Incidence of throat pain	14(24.1%)	34(58.6%)	<0.0001 *
Severity of throat pain	0(0-5)	2(0-7)	<0.0001 *

* Denotes statistical significance between groups.

Abbreviations: LUS: lung ultrasound, PONV: postoperative nausea and vomiting.

Figures

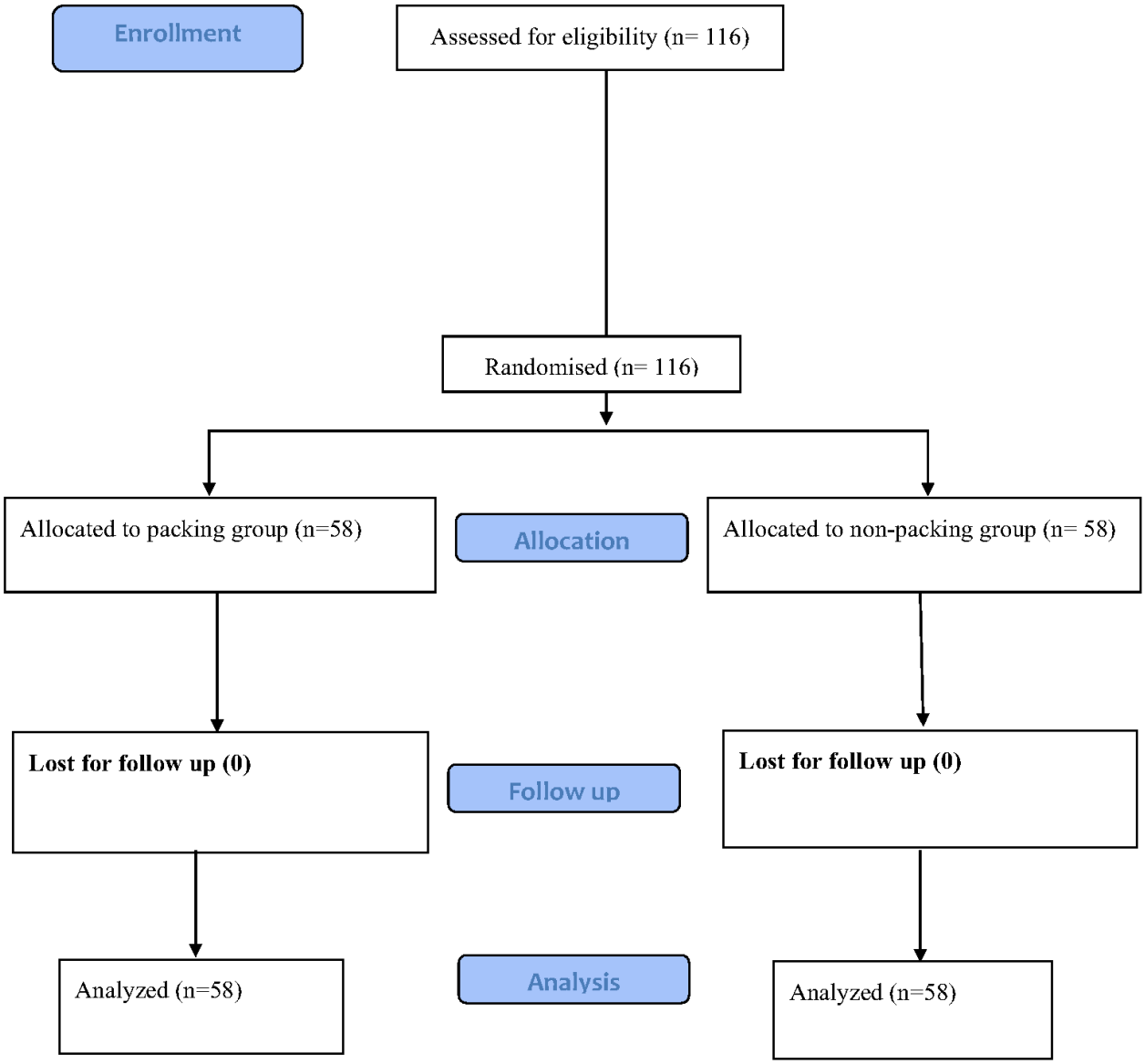


Figure (1) Flow diagram showing patient enrolment and analysis.

Figure 1

See image above for figure legend

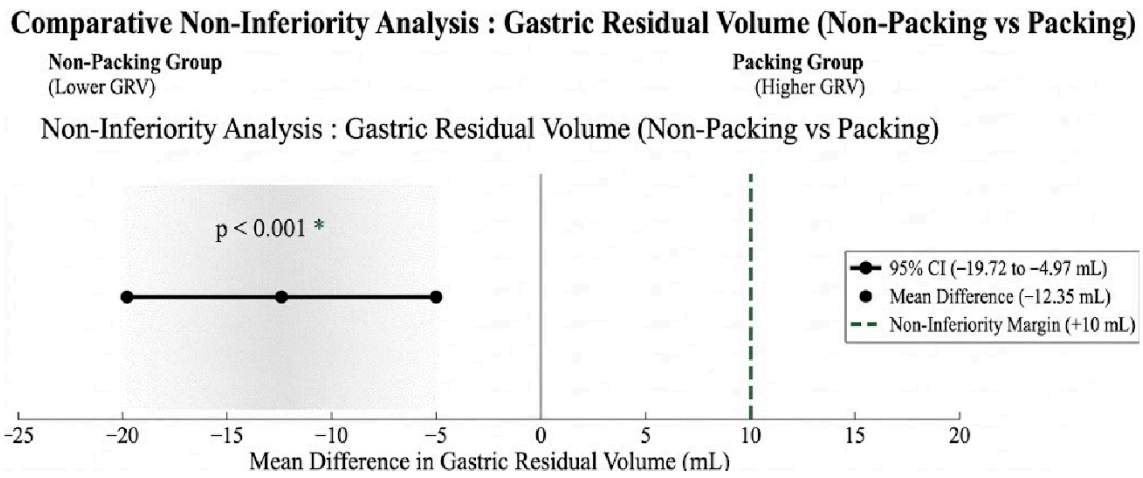


Figure 2

Non inferiority analysis of GFV difference between groups at the end of operation.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- CONSORT2010Checklist1.doc