

A comparative study of laparoscopic and open Nissen fundoplication for GERD in Georgia



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AIM: The study compares and analyzes the effectiveness and outcomes of open A. Chernousov modified Nissen fundoplication (CMNF) and laparoscopic total fundoplication in Georgia for gastroesophageal reflux disease (GERD) concerning perioperative course, postoperative complications, symptomatic relief, recurrent disease and the need for reinterventional surgery.

MATERIALS AND METHODS: A prospective randomized trial was performed. Two hundred fortythree patients with GERD were randomized, 123 patients underwent open CMNF procedure and 120 patients of laparoscopic total fundoplication. Pre- and postoperative tests included endoscopy, X-Ray, patient questionnaire (GERD - HQRL scale) and clinical assessment. Patients were followed for 10 years.

RESULTS: This prospective randomized trial showed good and excellent long-term results after open and laparoscopic total fundoplication for GERD (92,7% vs 88,5% respectively) ($p=0,03$). After open CMNF procedure there were 3 cases of postoperative ventral hernia, 9 cases of mild dysphagia. There was no recurrence. After laparoscopic approach there were 7 cases of solid and transient dysphagia, 3 cases of hard stenosis of cardiacs caused by wrap. There were 2 cases of recurrence, 3 cases of reflux and 1 case of epigastric trocar hernia.

CONCLUSION: In Georgia as well as throughout the world laparoscopic total fundoplication at the present time is the preferred method of choice for the treatment of GERD. It has best cosmetic effect, less pain and wound problems, shorter hospital stay, early return to work. Open CMNF is safe and effective procedure too. It prevents slippage syndrome and is characterized by better control of reflux and less frequency of recurrence and guarantees slightly better long-term functional results.

KEY WORDS: Antireflux surgery, GERD, Modified Nissen fundoplication, Prospective randomized trial

Introduction

According to our results occurrence of GERD is over 40% in Georgia's population¹. The most common symptoms are: heartburn, regurgitation, dysphagia,

belching, chest pain^{1,3,4}, it is determined by high psychosocial trauma, unhealthy lifestyle, eating low quality foods, bad habits (alcohol, coffee, cigarette) etc. in the large part of the population¹.

Most patients refer to the hospitals mainly with complicated GERD and established esophageal hiatal hernia, which is the major etiological factor of GERD – up to 80% according to the WHO statistics^{4,8,9}.

Despite the effectiveness of modern drugs in the treatment of GERD, the best method is either a laparotomic or a laparoscopic antireflux surgery^{4,5,9,20}.

In Georgia as well as throughout the world the best method of surgery treatment is Nissen fundoplication and its modifications^{3,4,8,16}. For the first time

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TABLE I - Clinical and diagnostic results before procedures

243 patients with GERD	GERD – HRQL scale	X- Ray presence of hiatal hernia	Endoscopy Savary – Miller grade
	0 grade 9 patients – 3.7%	No hernia 15 patients – 6.1%	I grade 37 – 15.2%
	1 grade 26 patients – 10.7%	Axial 98 patients – 40.3%	II grade 108 – 44.4%
	2 grade 60 patients – 24.6%	Mix 61 patients – 25.1%	III grade 71 – 29.2%
	3 grade 78 patients – 32%	Paraesophageal 69 patients – 28.3%	IV grade 27 – 11.1%
	4 grade 47 patients – 19.3%		
	5 grade 23 patients – 9.4%		

laparoscopic antireflux procedure was conducted in 1996 in our country, which is now widely used.

The study presents a prospective, randomized comparative trial of long – term results of laparoscopic and open Nissen fundoplication for GERD.

Materials and Methods

Between the 2000-2010 years, 243 patients (average age was 42.5) underwent antireflux surgery, with both open and laparoscopic procedures. All patients responded to the questionnaires (GERD – HQRL scale), underwent upper gastrointestinal tract X-ray and endoscopy^{4,6,7,24} (Table I).

The indications for surgical treatment were the following conditions: large size hernia, ineffective medical treatment, complications of GERD, atypical symptoms, concomitant diseases, young age of patients^{2,4,5,20}.

Statistical analysis was performed with Mann Whitney U-test for comparisons between the groups.

Open fundoplication procedure

Onehundred twentythree patients underwent open A. Chernousov modified Nissen fundoplication (CMNF), which is represented by the following steps: mobilization of abdominal segment of the esophagus, identification of the vagus nerves (Fig. 1), exposure of the esophageal hiatus, cutting the short gastric vessels, crurorraphy - posterior hiatoplasty (2-3 sutures) (Fig. 2), cuff formation (2-2.5 cm) and fixation of wrap: upper fixation of the wrap to the right and left wall of esophagus (Fig. 3) and lower fixation of the wrap to cardia¹⁰⁻¹² (Fig. 4).

Twenty-six patients with duodenal ulcer underwent additional selective proximal vagotomy, 3 patients simultaneous cholecystectomy, 2 patients with giant hernia underwent hiatoplasty with mesh (crurorraphy+Mesh)²⁵, 1 patient - splenectomy due to the lymphoma of spleen. One case of intraoperative complication was iatrogenic splenectomy.

Duration of procedures was 90-160 minutes.

Hospital stay ranged from 4 to 6 days and full recovery was achieved about two weeks.



Fig. 1: Identification of the vagus nerves.

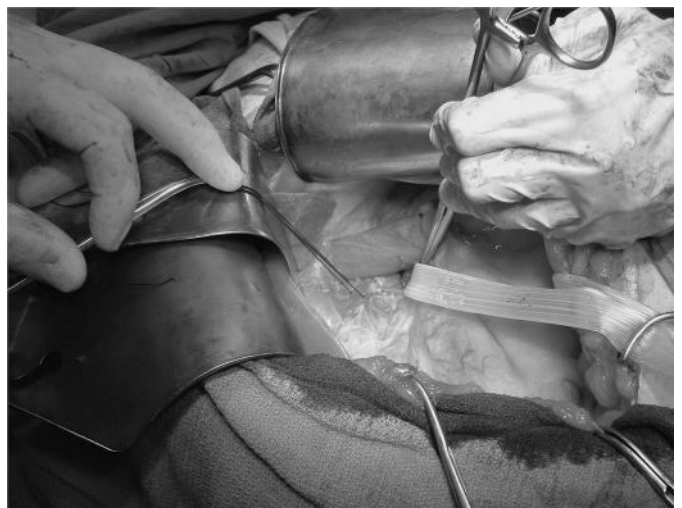


Fig. 2: Crurorraphy: posterior hiatoplasty.

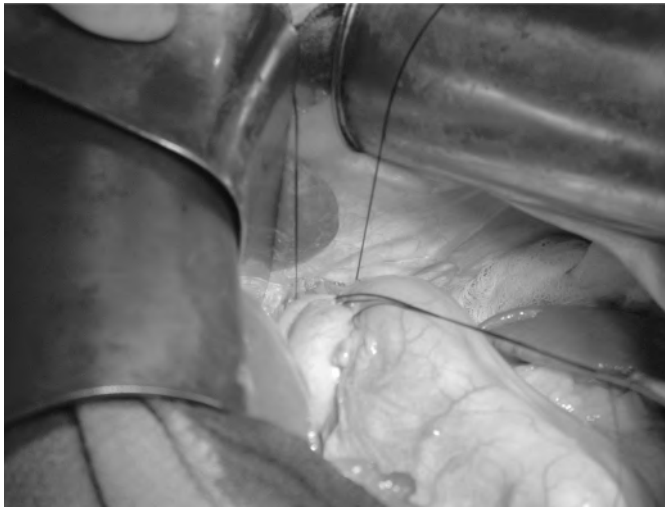


Fig. 3: CMNF: cuff formation and upper fixation of wrap to esophageal wall.



Fig. 4: CMNF: cuff formation and lower fixation of the wrap to cardia.

Laparoscopic fundoplication procedure

One hundred and twenty patients with GERD underwent laparoscopic crurotomy, fundoplication, three of them had undergone upper median laparotomy. Eighty-four patients underwent Nissen fundoplication and thirty-six patients - Nissen-Rosetti. There were 11 cases of fundoplication with additional cholecystectomy. There were 4 intraoperative complications - mediastinal and subcutaneous emphysema. By X-ray and auscultation there was no pneumothorax and no need for drainage procedure. Duration of procedures was 50-180 minutes. Control drain was removed on the next day, hospital stay ranged 2-3 days and full recovery was achieved after 7-10 days. The majority of patients had a positive effect after the operation, most of the complaints of GERD disappeared.

Results

During the 10 years we have evaluated long-term results of 243 patients (Open - 123, Laparoscopic - 120). They underwent upper gastrointestinal X-ray, endoscopy and responded to the questionnaires (GERD - HQRL scale). (Table II)

After "open" Nissen fundoplication there were 3 cases of postoperative ventral hernia, 9 cases of mild dysphagia, 1 month after medication treatment there was full recovery. The endoscopy and X-Ray revealed a good swallow and functional status of esophagus and stomach. There was no recurrence. The good and excellent results were achieved in 92,7% of cases.

After laparoscopic approach there were 2 cases of hard dysphagia, needed double pneumodilation, 5 cases - transient dysphagia, in one case hard cardia stenosis, caused by wrap - partial migration to the mediastinum - partial recurrence, after medication treatment symptoms of reflux disappeared. One case hard cardia

TABLE II - Open VS laparoscopic total fundoplication. Long - term results after 10 years period

	Open procedure 123 patients		Laparoscopic procedure 120 patients		p value
GERD - HRQL Scale	0 grade	103 patients - 83,7%	0 grade	87 patients - 72,5%	p=0.02
	1 grade	11 patients - 8,9%	1 grade	11 patients - 9,1%	
	2 grade	5 patients - 4%	2 grade	8 patients - 6,6%	
	3 grade	4 patients - 3,2%	3 grade	6 patients - 5%	
			4 grade	5 patients - 4,1%	
			5 grade	3 patients - 2,5%	
Endoscopy Savary - Miller	I grade	9 patients - 7,3%	I grade	10 patients - 8,3%	p=0.18
	II grade	5 patients - 4%	II grade	8 patients - 6,6%	
	III grade	4 patients - 3,2%	III grade	5 patients - 4,1%	
			IV grade	2 patients - 1,6%	

TABLE III - Open VS laparoscopic total fundoplication. Long - term results after 10 years

	Open procedure - 123 patients	Laparoscopic procedure - 120 patients	p value
Reccurence	0 None	3 patients - 2.5%	p = 0.7
Dysphagia	9 patients - 7.3%	7 patients - 5.8%	p = 0.6
Reflux	0 None	3 patients - 2.5%	p = 0.7
Reinterventional Surgery	3 patients - 2.4% Postoperative ventral hernia	3 patients - 2.5% in one case epigastric troacar hernia	p = 0.9

stenosis ended by relaparoscopy removal sutures from the crura. One case of cuff deformation caused by adhesive process and hard cardia stenosis -relaparoscopy, adhesiolysis. There were 3 cases of reflux, needed prolonged PPI treatment. One patient had epigastric troacar hernia. The good and excellent results were achieved in 88,5% of cases. (Table III)

Discussion

This prospective, comparative randomized study showed good and the excellent long-term results during 10 years period after the both procedures: open and laparoscopic total fundoplication for GERD (92,7% vs 88,5% respectively) ($p=0.03$), which looks similar with the published series in literature^{9,13-18, 20-25}.

It should be noted, that at laparoscopic approach less operative trauma, reduced duration of procedures, quick full recovery and the best cosmetic effect can be achieved. According to our study (Table III) frequency of dysphagia is less after laparoscopic 5,8% than open approach 7,3% ($p=0.6$). Recurrence, determined by slippage- syndrome, hard stenosis of esophagus and frequency of refunduplications by laparoscopic approach were in 4,2% of cases, when there was not any case of them by open A. Chernousov modified Nissen fundoplication, but there were 3 cases of postoperative ventral hernias.

Hakanson, Thor at el.²¹ in their study showed slightly better early symptomatic outcome in the open group but similar 3-year symptomatic control regardless of the surgical technique and improved surgical outcome for the laparoscopic approach. Fuchs in his study^{13,20} showed that the functional results of open and laparoscopic techniques were similar and effective reflux control had more than 85% of patients. Sundbu at el.^{22,23} in his randomized trials suggested that open antireflux results have better symptomatic control than the laparoscopic, with recurrence rates of 29% after laparoscopy procedure.

In the present study, according to the questionnaires ($p=0.02$), endoscopy ($p=0.18$) and X-ray investigations, it seems that long term results (Table II) after open A. Chernousov modified Nissen fundoplication (CMNF) is slightly better for functional status of esophagus and stomach than laparoscopic total fundoplication.

Conclusion

In Georgia as well as throughout the world laparoscopic total fundoplication at the present time is the preferred method of choice for the treatment of GERD. It has best cosmetic effect, less pain and wound problems, shorter hospital stay, early activation. Open CMNF is safe and effective procedure too. It prevents slippage syndrome and is characterized by better control of reflux and less frequency of recurrence and guarantees slightly better long-term functional results.

Riassunto

Lo studio paragona ed analizza l'efficacia ed i risultati della fundoplicatio di Nissen in laparotomia secondo la modifica di Chernousov (CMNF) e la fundoplicatio totale laparoscopica eseguite in Georgia per la malattia da reflusso gastroesofageo (GERD), prendendo in considerazione la tecnica operatoria, le complicanze postoperatorie, i vantaggi per la sintomatologia, le recidive e la necessità di successivi reinterventi.

Si tratta di uno studio prospettico randomizzato eseguito su 243 pazienti: 123 sottoposti alla procedura laparotomica CMNF e 120 pazienti trattati con la fundoplicatio totale laparoscopica. Gli esami pre- e postoperatori comprendono l'endoscopia, lo studio radiologico, un questionario da sottoporre al paziente (secondo lo schema GERD-HQRL) e lo studio clinico. Tutti i paziente sono stati controllati per un follow-up di 10 anni.

Questo trial prospettico randomizzato ha mostrato risultati a lungo termine rispettivamente buoni ed eccellenti dopo chirurgia laparotomica e laparoscopica per GERD (92,7% vs 88,5% rispettivamente) ($p=0,03$).

Dopo CMNF laparotomica si sono verificati tre casi di laparocela e 9 casi di modica disfagia. In nessun caso di è registrata una recidiva.

Dopo approccio laparoscopico si sono osservati 7 casi di disfagia transitoria per i solidi, 3 casi di stenosi grave a livello cardiaco in rapporto alla plicatura. Vi sono stati due casi di recidiva, 3 casi di reflusso ed 1 caso di ernia epigastrica a livello del foro del trocar.

Come nel resto del mondo, attualmente in Georgia la fundoplicatio totale per via laparoscopica rappresenta il metodo preferito di scelta per il trattamento della GERD.

Esso presenta i migliori risultati estetici, il minor dolore ed i minori problemi a livello delle ferite, un più breve ricovero e un più precoce ritorno all'attività. Anche la procedura CMNF laparotomica è efficace e sicura. In essa si previene la sindrome da scivolamento ed è caratterizzata da un migliore controllo del reflusso ed una minore incidenza delle recidive, e garantisce dei risultati funzionali lievemente migliori a lungo termine.

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