

**National Research University Higher
School of Economics
A.V.Vyshnevsky Institute of Surgery**

**THE OPTIMAL APPLICATION OF
ROBOTIC-SURGICAL COMPLEXES IN
ABDOMINAL SURGERY: THE LOGICS
AND METHODOLOGY OF RESEARCH**

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History



1999 - Intuitive Surgical
presented «da Vinci»
robotic complex

07 September 2001



Fig. 2.3. The first robot-assisted laparoscopic cholecystectomy in a human, between New York (surgeons) and Strasbourg (patient), on 7 September 2001

Advantages of RSC



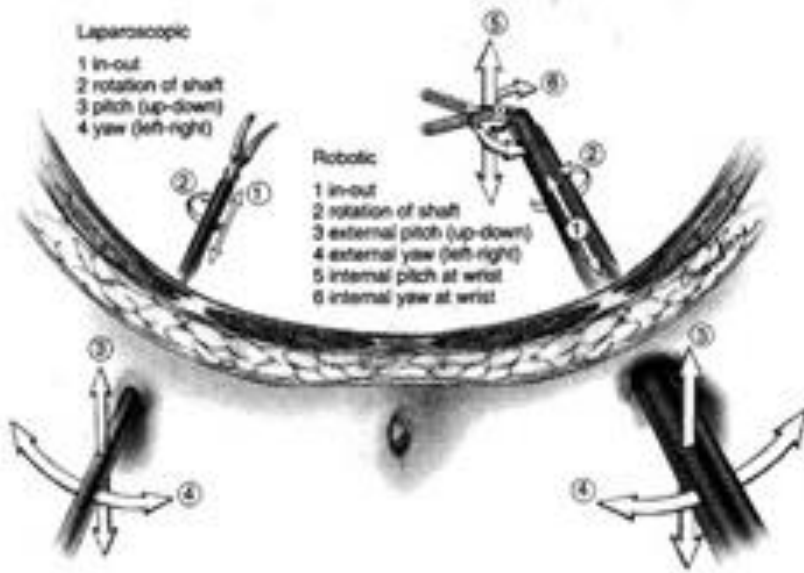
EndoWrist technology



3D

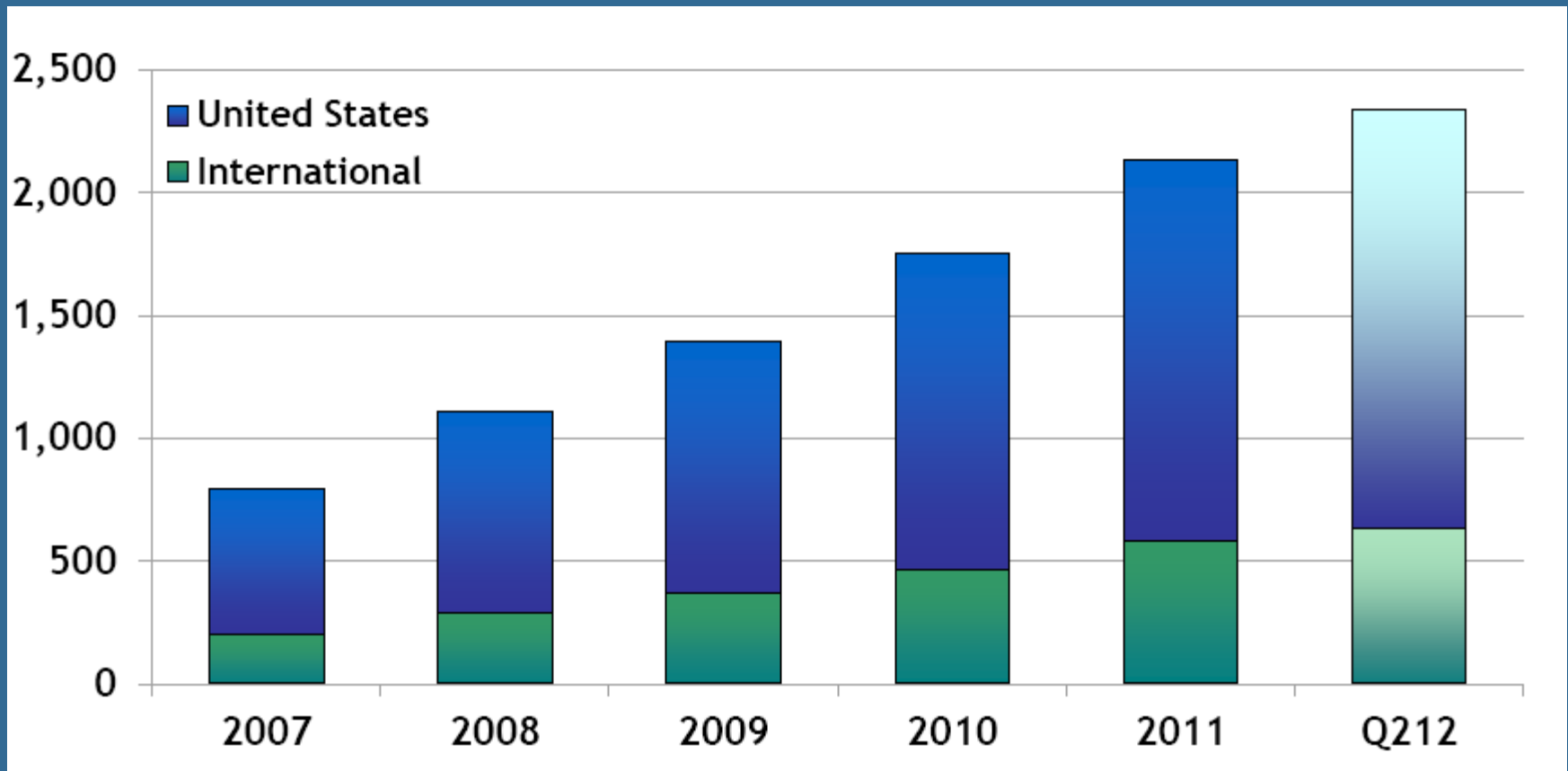


da VINCI: DEGREES OF FREEDOM

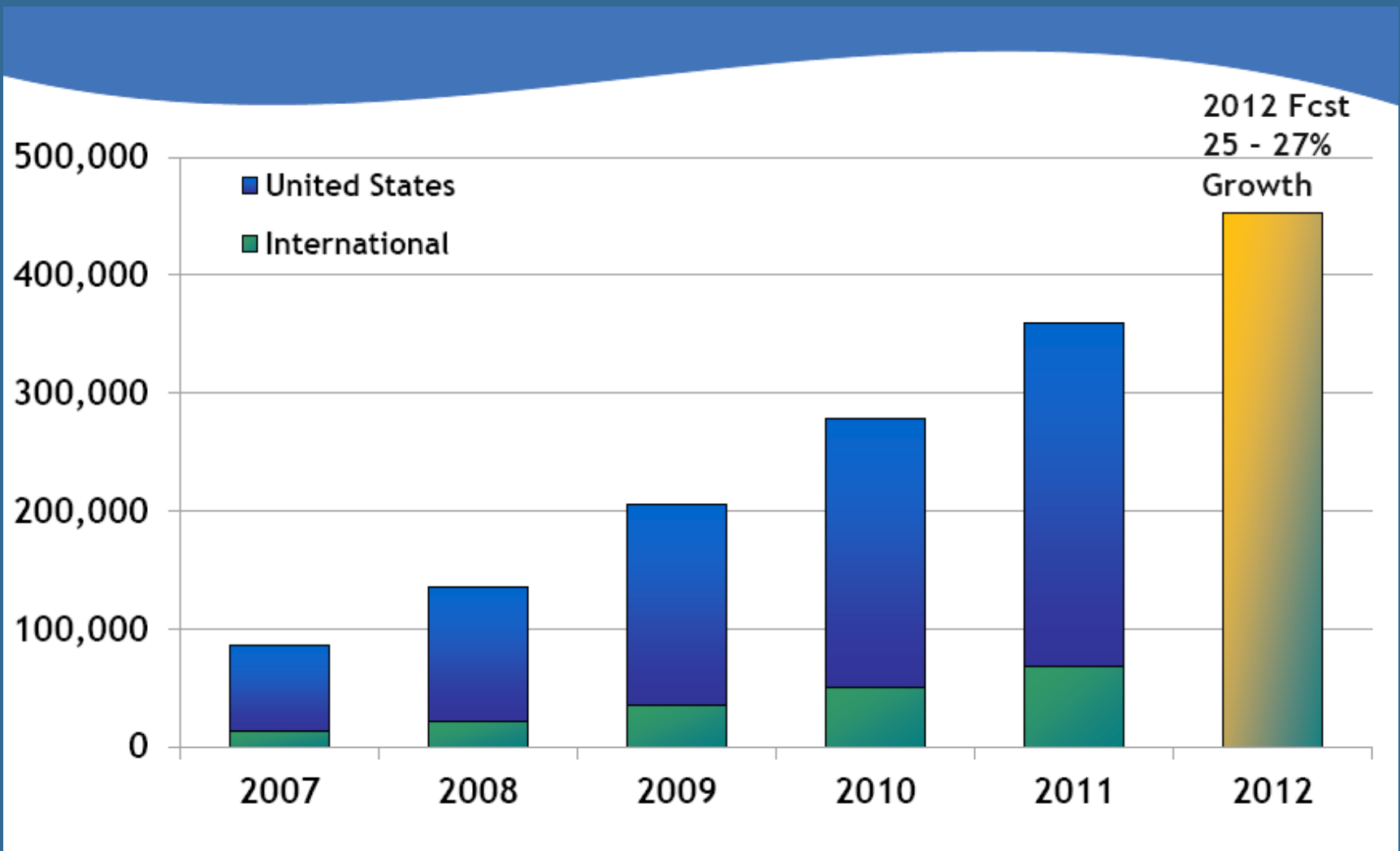


- 10 times zoom
- fixed camera and image
- highest precision
- work in hard-to-reach zones

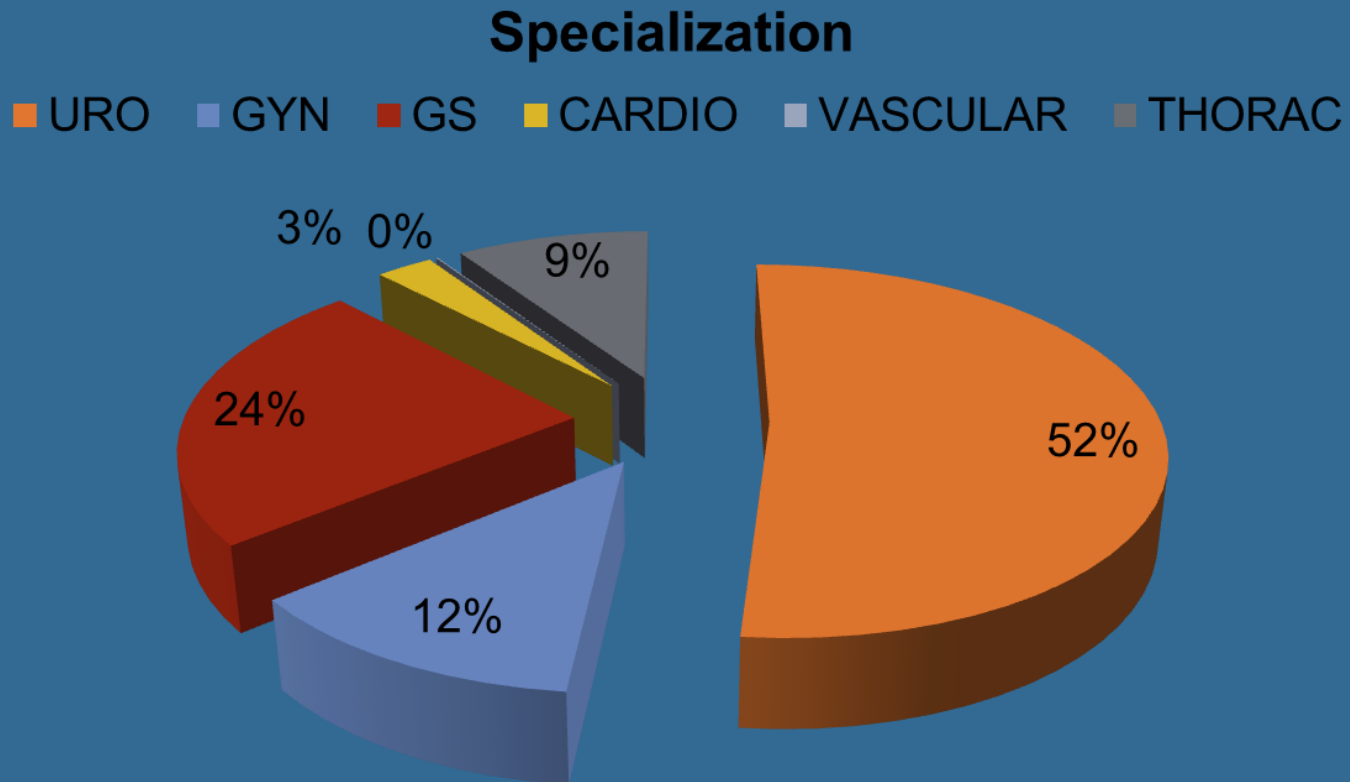
RSC «da Vinci» in world



Robotic assisted operations in world



The range of robotic assisted operations (Russia, 2012)



[Ann Surg](#). 2012 Aug 3. [Epub ahead of print]

Robot-Assisted Minimally Invasive Distal Pancreatectomy Is Superior to the Laparoscopic Technique.

[Daouadi M](#), [Zureikat AH](#), [Zenati MS](#), [Choudry H](#), [Tsunog A](#), [Bartlett DL](#), [Hughes SJ](#), [Lee KK](#), [Moser AJ](#), [Zeh HJ](#).

Division of GI Surgical *Oncology, General Surgery †Epidemiology ‡Transplantation §Hepatobiliary and Pancreatic Surgery, Department of Surgery, University of Pittsburgh Medical Center, Pittsburgh, PA ‖Division of General Surgery, Department of Surgery, University of Florida, Gainesville, FL.

[Nat Rev Gastroenterol Hepatol](#). 2012 Aug;9(8):468-76. doi: 10.1038/nrgastro.2012.120. Epub 2012 Jun 26.

The current state of robotic-assisted pancreatic surgery.

[Winer J](#), [Can MF](#), [Bartlett DL](#), [Zeh HJ](#), [Zureikat AH](#).

Division of GI Surgical Oncology, Department of Surgery, University of Pittsburgh Medical Center, 5150 Center Avenue, Pittsburgh, PA 15213, USA.

Robotic liver resection: technique and results of 30 consecutive procedures

[Gi Hong Choi](#) · [Sung Hoon Choi](#) · [Sung Hoon Kim](#) ·
[Ho Kyoung Hwang](#) · [Chang Moo Kang](#) ·
[Jin Sub Choi](#) · [Woo Jung Lee](#)

Robotic total mesorectal excision for the treatment of rectal cancer

[Seung Hyuk Baik](#) · [Chang Moo Kang](#) · [Woo Jung Lee](#) ·
[Nam Kyu Kim](#) · [Seung Kook Sohn](#) · [Hoon Sang Chi](#) ·
[Chang Hwan Cho](#)

Systematic review of robotic liver resection

[Cheng-Maw Ho](#) · [Go Wakabayashi](#) ·
[Hiroyuki Nitta](#) · [Naoko Ito](#) · [Yasushi Hasegawa](#) ·
[Takeshi Takahara](#)

[Dis Colon Rectum](#). 2013 Jun;56(6):786-96. doi: 10.1097/DCR.0b013e318285b810.

Robotic colonic surgery: is it advisable to commence a new learning curve?

[Fung AK](#), [Aly EH](#).

Laparoscopic Colorectal Surgery & Training Unit, Aberdeen Royal Infirmary, Aberdeen, Scotland, United Kingdom.

[Int J Med Robot](#). 2013 May 2. doi: 10.1002/rcs.1507. [Epub ahead of print]

Single-site robotic cholecystectomy: efficiency and cost analysis.

[Buzad FA](#), [Corne LM](#), [Brown TC](#), [Fagin RS](#), [Hebert AE](#), [Kaczmarek CA](#), [Pack AN](#), [Payne TN](#).

Texas Institute for Robotic Surgery and Austin Diagnostic Clinic, Austin, TX, USA.

[Int J Med Robot](#). 2013 May 2. doi: 10.1002/rcs.1497. [Epub ahead of print]

Comparison of robotic adrenalectomy with traditional laparoscopic adrenalectomy with a lateral transperitoneal approach: a single-surgeon experience.

[You JY](#), [Lee HY](#), [Son GS](#), [Lee JB](#), [Bae JW](#), [Kim HY](#).

Department of Surgery, Korea University College of Medicine, Seoul, Korea.

[Eur Urol](#). 2013 Apr 4. pii: S0302-2838(13)00339-4. doi: 10.1016/j.eururo.2013.03.052. [Epub ahead of print]

Three-year Oncologic and Renal Functional Outcomes After Robot-assisted Partial Nephrectomy.

[Khalifeh A](#), [Autorino R](#), [Eyraud R](#), [Samarasekera D](#), [Laydner H](#), [Panumatrasamee K](#), [Stein RJ](#), [Kaouk JH](#).

Center for Laparoscopic and Robotic Surgery, Glickman Urological and Kidney Institute, Cleveland Clinic, Cleveland, OH, USA.

Laparoscopic robotic-assisted gastrointestinal surgery: the Geneva experience

[Claudio Soravia](#) · [Ian Schwieger](#) · [Jacques-Alain Witzig](#) · [Frank-Alain Wassmer](#) ·
[Thierry Vedrenne](#) · [Pierre Sutter](#) · [Jean-Philippe Dufour](#) · [Yves Racloz](#)

Objective evaluation of expert performance during human robotic surgical procedures

[Timothy N. Judkins](#) · [Dmitry Oleynikov](#) ·
[Nick Stergiou](#)

Robotic liver surgery: Results for 70 resections

[Pier Cristoforo Giulianotti](#), MD, FACS,^a [Andrea Coratti](#), MD,^b [Fabio Sbrana](#), MD, FACS,^a [Pietro Addeo](#), MD,^a [Francesco Maria Bianco](#), MD,^a [Nicolas Christian Buchs](#), MD,^a [Mario Annechiarico](#), MD,^b and [Enrico Benedetti](#), MD, FACS,^c *Chicago, IL, and Grosseto, Italy*

[World J Surg](#). 2013 May 4. [Epub ahead of print]

Application of Fluorescence in Robotic General Surgery: Review of the Literature and State of the Art.

[Marano A](#), [Priora F](#), [Lenti LM](#), [Ravazzoni F](#), [Quarati R](#), [Spinoglio G](#).

Department of General and Oncologic Surgery, SS Antonio e Biagio Hospital, Via Venezia 16, 15121, Alessandria, Italy, alessandra.marano@hotmail.com.

[Int J Med Robot](#). 2013 May 2. doi: 10.1002/rcs.1503. [Epub ahead of print]

An actuated force feedback-enabled laparoscopic instrument for robotic-assisted surgery.

[Moradi Dalvand M](#), [Shirinzadeh B](#), [Shamdani AH](#), [Smith J](#), [Zhong Y](#).

Department of Mechanical and Aerospace Engineering, Monash University, Melbourne, Australia.

[Br J Surg](#). 2013 Jun;100(7):917-25. doi: 10.1002/bjs.9135.

Feasibility of robotic pancreaticoduodenectomy.

[Boggi U](#), [Signori S](#), [De Lio N](#), [Perrone VG](#), [Vistoli F](#), [Belluomini M](#), [Cappelli C](#), [Amorese G](#), [Mosca F](#).

Division of General and Transplant Surgery, Pisa University Hospital, Pisa, Italy.

The goal of the current survey

- is to create a system of rules for taking decisions regarding the use of RSC in abdominal surgery



The following objectives

- - identify the major reasons for selecting different techniques in conducting surgery on abdominal organs;
- - compare results of application of open (hand-guided) technology versus laparoscopic (LA) and robot-assisted technology in abdominal operations;
- - assess clinical and economic effectiveness of operations with the use of various techniques;
- - create a system of rules of the rational selection of RSC in conducting abdominal operations.

Methodology of the survey

- The results of the analysis of RA operations performed in A.V.Vyshnevsky Institute of Surgery
- Analysis of medical articles dealing with the application of various techniques in conducting abdominal surgery
- The survey of the leading surgeons performing abdominal operations



The results of the analysis of RAO performed in Institute of surgery

- **Hypothesis 1** - the specifics of a patient, the diagnosis and pending operation should be taken into account;
- **Hypothesis 2** - low injury level (mini-invasiveness) and high level of precision
- **Hypothesis 3** - small neoplasms and localization of pathology in hard-to-reach zones
- **Hypothesis 4** - the optimal application zone for robot assisted surgery is determined by technological, financial, economic, and organizational aspects



Analysis of medical articles

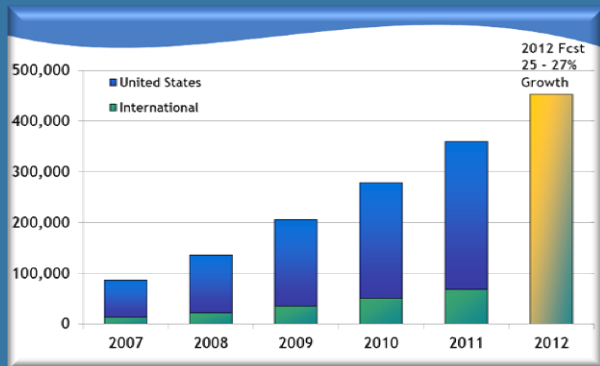
Content analysis (CA) developed by the American scholars H.Lasswell and B.Berelson

The principal characteristic features:

- - a clearly defined system of goals, which as a rule, does not concur with the goals of the authors of materials analyzed;
- - predominant use of qualitative, specifically, textual information in the analysis, not quantitative data;
- - possibility in conducting a survey to unify the works of different authors, their opinions and expertise.

Content analysis

Information base of the survey



2003-2013

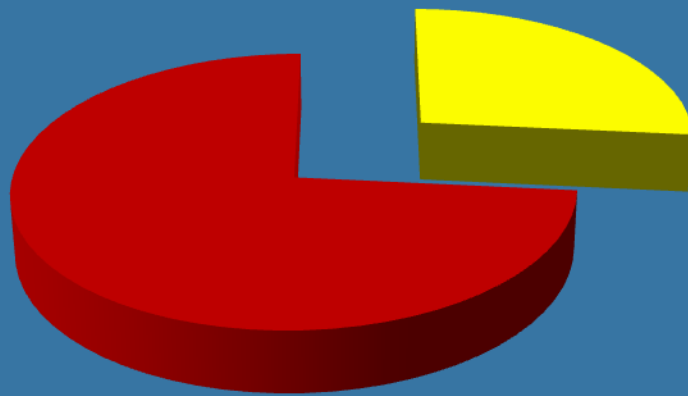
344 clinical cases

130 specialists

Content analysis

Age: 25-85 years (59,8)

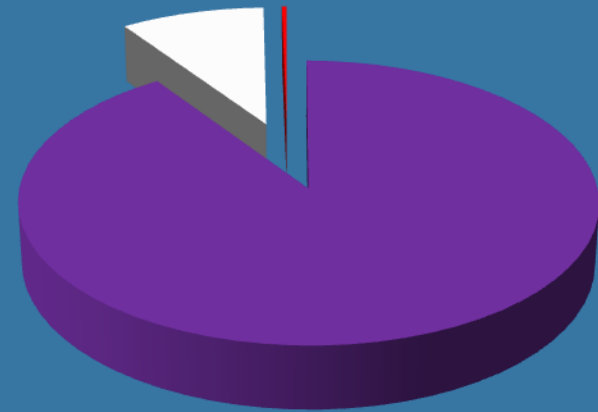
Localization (95,9%)



■ Front segments 26,5%

■ Back segments 73,5%

Size (79,4%)



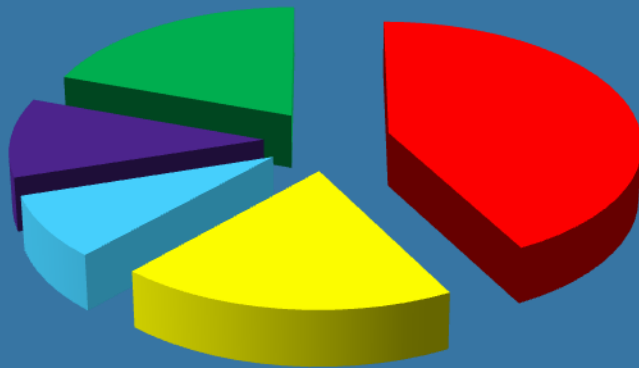
■ less than 10 cm - 90,5%

■ 10 cm - 9,2%

■ more than 10 cm - 0,3%

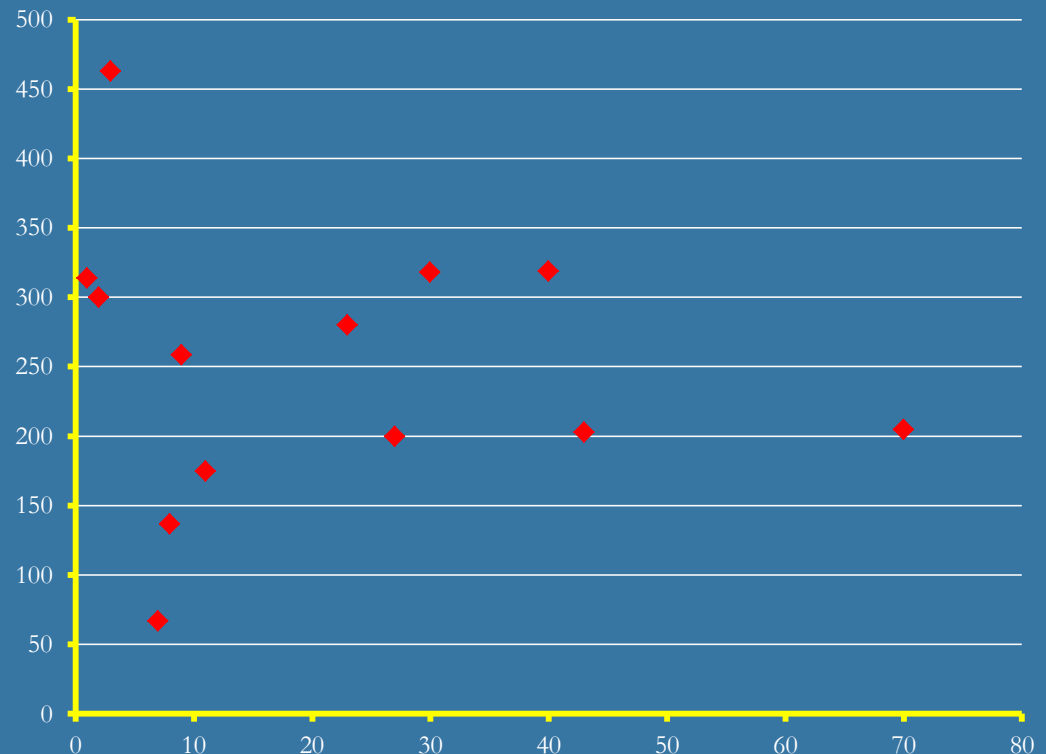
Content analysis

The operation

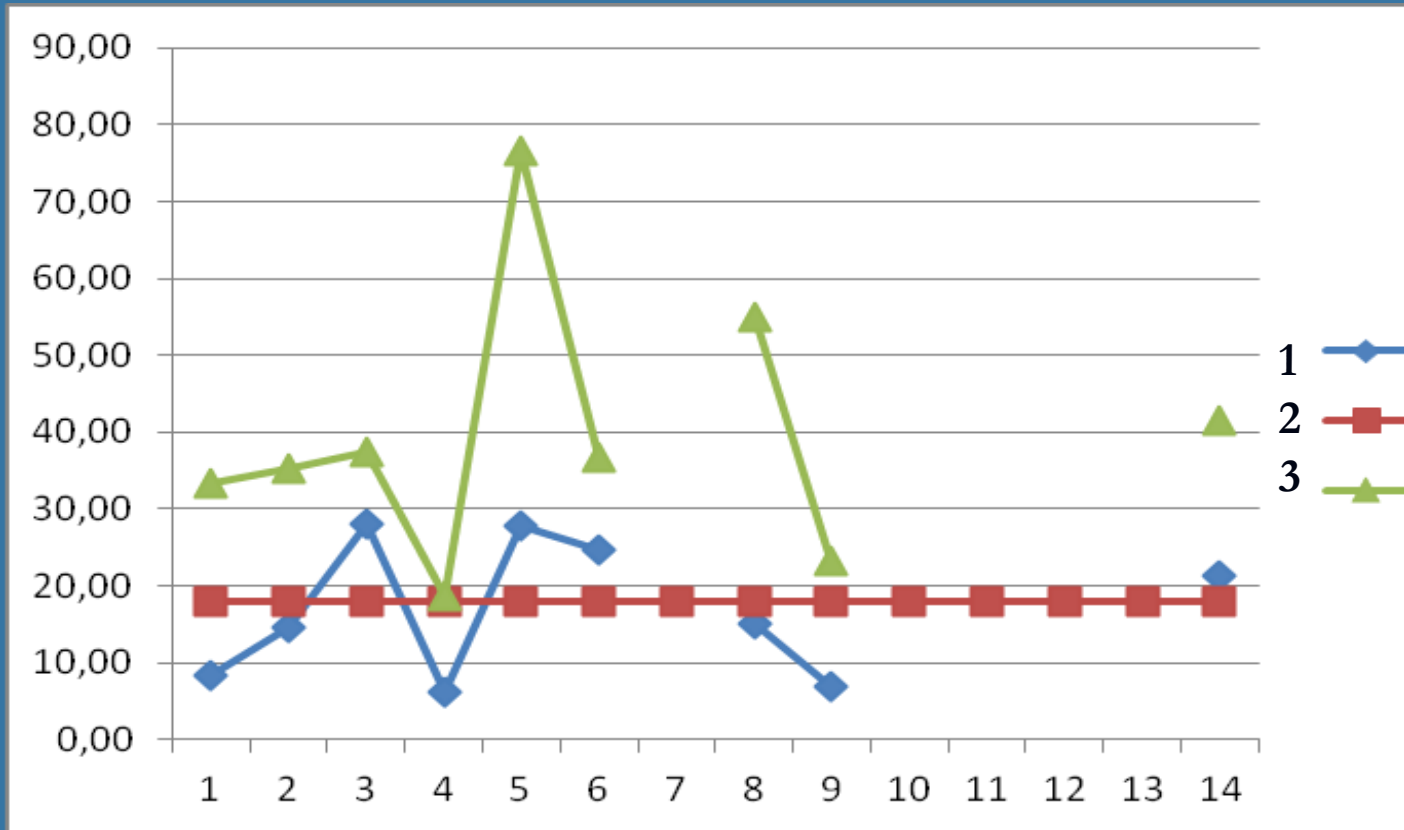


- Anatomic resections 42,2%
- Right hemigepatectomy 19,5%
- Left hemigepatectomy 8,3%
- Resection of the past segments 10,4%
- Resection of the front segments 19,5%

The duration of operation 26-812 min. (278 min.)



Content analysis



- 1 - the number of postoperative complications depending on number of procedures;*
- 2 - the average number of complications;*
- 3 - the number of higher complexity procedures.*

The survey of the leading surgeons performing abdominal operations



Thank you!

