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Simultaneous surgical interventions

Gallstone disease is a very common surgical pathology and is often combined with other surgical diseases. The treatment tactic in the case of combined pathology depends on many circumstances, but the most appropriate is one-step treatment. The use of endovideosurgery is a priority. An overview of various sources allows a meta-analysis to be done. Conclusions are unambiguous – simultaneous surgical interventions do not carry additional risks, increase the effectiveness of treatment, reduce the risk of postoperative internal hospital complications.

Key words: simultaneous; combined; surgery; interventions; gallstone disease; cholecystitis; choledocholithiasis; endovideosurgery; laparoscopy; risks; meta-analysis.

According to official statistics provided by the WHO, at present in the EU and the United Kingdom, the share of surgical patients with several surgical diseases at the same time is up to 30 %; in the USA the statistics are similar. There are no reasons to consider that the morbidity structure in Ukraine is different. All differences and errors are easily explained both by defects in diagnostics and non-ideal methodology, so we will only take into account the statistics of the EU and the USA, which argue that this problem is extremely relevant in surgery. The aim of our work is to review current data on combined surgical pathologies and their simultaneous treatment by performing simulant surgical interventions, which will be relevant for surgeons. Analysis of data on preoperative, intraoperative risks, postoperative care, and efficiency in terms of cost-effectiveness and bed-days will be helpful to anesthesiologists and OHC physicians.

The research was done on the basis of analyzed publications from authoritative sources with an adequate methodology. The main source of data was the PubMed and MedScape databases that obtained data from mono- and multicenteral clinical trials and published meta-analyzes in such sources as: WJSO, JSLS, WJG, EIO, BMC Surgery, JAMA, Royal Australasian College of Surgeons WEBS. The studies analyzed age, gender, type and combination of diseases, the type and period of treatment, the period of hospitalization, including separately the term of surgery and anesthesia, operational blood loss, complications during and after surgery, preoperative risks, and mortality risk. Also, in some studies, the number of surgeons and assistants, the number of equipment involved were taken into account individually, and the financial component of the treatment was also calculated.

One of the most common surgical diseases is cholelithiasis, which accounts for 15 % of all surgical patients in the adult population, among whom women account for up to 65 %, which in turn is associated with the specifics of female hormonal metabolism. It is also known that in up to 20 % of all patients with cholelithiasis, the pathology is complicated with choledocholithiasis, which is threated by conditions and complications requiring urgent surgical treatment. According to various authors, from 6 to 13 % of patients with cholelithiasis have an extra-biliral pathology. That is why since 1985 the WHO has adopted an unaltered strategy that surgical treatment should be performed as planned as soon as possible from the moment of diagnosis of the disease, as well as, if necessary, simultaneous treatment of the concomitant or the main illness, that is combined or caused by cholelithiasis. Of course, the gold standard for treatment of cholelithiasis is laparoscopic cholecystectomy, choledocholithotomy and the operation of such disease by open method is performed only when there are factors that make laparoscopic operations impossible, such as the lack of a material base or a competent specialist. Data on the number of most commonly performed operations, including laparoscopically performed by most, is a direct confirmation of this.

Simultaneous operations are much more expedient than multi-stage treatment or delayed treatment of pathology, which currently does not cause conditions requiring emergency treatment at the moment. This is easily explained by aspects such as the prevention of terrible complications in scheduled treatment, reduction of postoperative complications, reduction of the total time of surgical treatment, compared with the separate treatment of several pathologies, reduction of intra- and postoperative lethality. It is also understandable that treatment in a planned manner guarantees the relief of work of a surgeon, and also facilitates the postoperative period for the patient. Despite the fact that the simultaneous surgical

	Cholecystectomy	of which: laparoscopic cholecystectomy	Repair of inguinal hernia	of which: laparoscopic repair of inguinal hernia	Hysterectomy	of which: laparoscopic hysterectomy	Caesarean section	Hip replacement
Belgium (*)	221.4	202.5	217.7	0.3	124.9	56.2	231.6	254.5
Bulgaria	:	:	:	:	:	:	369.7	:
Czech Republic	:	:	:	:	*147.8*	*81.4*	266.4	*180.2*
Denmark	158.6	147.5	206.2	95.5	13.3	:	216.0	236.6
Germany	244.5	199.4	210.7	121.7	140.7	45.6	272.8	299.3
Estonia	225.4	203.2	171.3	*19.4*	144.0	72.7	197.3	155.7
Ireland	107.3	96.6	81.1	15.3	55.6	10.8	422.0	130.9
Greece	:	:	:	:	:	:	:	:
Spain	173.8	146.2	195.9	6.6	79.5	19.8	220.8	112.9
France	195.9	177.5	230.7	78.6	94.0	30.7	236.8	240.6
Croatia	219.4	198.9	192.3	12.1	93.8	10.8	183.6	133.3
Italy	192.7	164.5	225.0	*6.0*	98.4	26.6	282.2	171.9
Cyprus	88.0	73.9	101.1	3.1	48.3	5.3	632.1	51.2
Latvia (*)	117.6	93.4	:	:	91.7	:	233.6	141.7
Lithuania	274.5	252.0	180.5	41.4	150.5	47.9	214.8	195.6
Luxembourg	*158.8*	:	*199.1*	:	*126.7*	:	*322.5*	*206.8*
Hungary	240.9	208.3	193.9	28.2	91.5	5.6	348.3	137.9
Malta	89.6	82.0	269.1	27.6	146.8	12.5	316.1	79.0
Netherlands	:	:	:	:	:	:	:	:
Austria	217.6	188.7	274.1	122.2	103.6	34.9	280.4	271.1
Poland	204.5	170.0	152.1	:	97.6	54.9	351.6	111.7
Portugal (*)	156.5	132.8	155.9	3.3	87.8	9.4	*267.0*	90.6
Romania	234.2	183.2	126.3	8.6	105.7	2.9	432.1	65.4
Slovenia	229.1	197.3	201.0	10.4	108.5	11.9	207.6	173.0
Slovakia (*)	:	:	175.6	57.4	53.7	26.6	309.7	122.5
Finland	151.4	136.3	199.7	20.6	86.7	52.3	156.6	247.3
Sweden	143.8	126.3	166.8	8.0	93.1	25.6	202.9	234.0
United Kingdom	137.6	124.4	130.1	28.4	78.2	20.6	312.5	182.4
Iceland (*)	99.2	93.1	13.6	3.3	107.9	31.7	199.5	146.9
Liechtenstein	2.7	2.7	34.7	0.0	58.7	0.0	0.0	26.7
Norway	112.3	105.8	116.9	55.1	75.6	27.7	182.9	244.2
Switzerland	202.4	177.0	221.6	94.4	144.4	73.2	343.9	307.7
Former Yugoslav Republic of Macedonia	162.1	110.9	205.0	1.9	67.2	0.4	328.2	56.1
Serbia (*)	214.1	149.9	194.1	2.8	93.9	3.0	276.9	115.2

interventions last longer than usual ones, the time of treatment for two pathologies is simultaneously much smaller than the total incremental. It is also easy to understand that in some pathologies (like the umbilical cord, ventral hernia, cholecystitis, ovarian cyst, etc.), surgery itself often takes less time than preoperative preparation and postoperative anesthetic care. These facts make step-by-step treatment inappropriate, and often dangerous. According to JAMA, the simultaneous implementation of the surgical treatment of several pathologies, including cardiovascular, does not increase the risk of postoperative complications or postoperative lethality, as well as a follow-up period of an average of 68 months, it can be argued that after a long time, the mortality between patients who performed one operation and the simulants do not differ.

Short-term Results*

Variable	Subjects Who Underwent Simultaneous Surgical Procedures	Subjects Who Underwent Aortic Repair Alone	*P* Value
Duration of operation, min	185.5	161.1	.62
Duration of postoperative ventilatory assistance, h	15	20	.55
Duration of intensive care unit stay, d	2.1	2.0	.95
Duration of postoperative hospitalization, d	11	13	.81
Patients who received blood transfusions, No.	22	20	.85
Blood units transfused for each patient, No.	2.0	2.0	1.0

*Data are given as median values, except for the patients who received blood transfusions.

While conducting simultaneous operations, one of which is resection of the intestine with colorectal cancer, mortality (combined vs non-combined, 15.1 % vs 13.5 %, P = 0.667), postoperative complications and part of conversions did not differ in both groups, indicating safety and the effectiveness of the method.

The same conclusion was reached by researchers from WJSO, JSLS, WJG, EIO, BMC Surgery, JAMA in the analysis of simultaneous surgical interventions in traumatic hernias, transdiaphragmatic intercostal hernias, adrenal gland tumors, splenectomy, hemihepatectomy, angiosarcomas, hepatic metastases.

Also, the profile of security and efficiency was proven when performing competitive operations.

It should be noticed, that in all analyzed works, there was no significant increase in anesthetic risks or a significant increase in blood loss. There is also an immediate increase in efficiency in terms of bed-days, as well as striking effectiveness in the economic plan, compared with the implementation of stage treatment.

Table 1. Baseline data and outcomes from overlapping and non-overlapping surgery (Hyder, Hanson et al. 2016)

	University HealthSystem consortium cohort		ACS-NSQIP cohort	
	Overlapping (n=10,614)	Non-overlapping (N=16,111)	Overlapping (N=3,712)	Non-overlapping (N=5637)
Preoperative factors				
Age, y, mean (SD)	60.4 (15.3)	60.3 (15.6)	59.5 (14.9)	58.1 (15.8)
Sex, N (%, female)	5,034 (47.4)	7,575 (47.0)	1,859 (50.1)	3,034 (53.8)
ASA-PS III or IV, N (%)	4,850 (45.7)	7,286 (45.2)	1,235 (33.3)	1,722 (30.5)
Registry estimated mortality mean (SD)	0.0076 (0.0221)	0.0107 (0.0392)	0.0035 (0.0119)	0.0025 (0.0058)
Registry estimated LOS mean (SD)	5.0 (3.5)	5.2 (4.3)	NA	0.048 (0.054)
Surgical specialty, N (%)				
Cardiovascular	1,401 (13.2)	1,454 (9.0)	0 (0.0)	0 (0.0)
Colorectal	650 (6.1)	1,443 (9.0)	215 (5.8)	340 (6.0)
General	912 (8.6)	2,157 (13.4)	588 (15.8)	1,102 (19.5)
Gynaecological	454 (4.3)	394 (2.4)	291 (7.8)	423 (7.5)
Neurosurgery	1,303 (12.3)	1,370 (8.5)	386 (10.4)	381 (6.8)
Oral surgery	72 (0.7)	154 (1.0)	0 (0.0)	0 (0.0)
Orthopaedics	3,566 (33.6)	6,035 (37.5)	1,023 (27.6)	1,796 (31.9)
Otorhinolaryngology	341 (3.2)	191 (1.2)	368 (9.9)	359 (6.4)
Plastic and reconstructive	105 (1.0)	188 (1.2)	99 (2.7)	209 (3.7)
Reproductive	1 (0.0)	28 (0.2)	0 (0.0)	0 (0.0)
Thoracic	729 (6.9)	915 (5.7)	117 (3.2)	164 (2.9)
Trauma	38 (0.4)	67 (0.4)	25 (0.7)	24 (0.4)
Urology	630 (5.9)	1,245 (7.7)	428 (11.5)	684 (12.1)
Vascular	412 (3.9)	470 (2.9)	172 (4.6)	155 (2.7)
Outcomes				
Anaesthesia duration mean (SD)	278.8 (131.0)	232.2 (120.1)	248.3 (122.5)	202.7 (103.5)
Operative duration mean (SD)	193.6 (117.3)	152.8 (103.7	173.8 (110.0)	132.0 (88.3)
Actual mortality, N (%)	31 (0.3)	131 (0.8)	7 (0.2)	8 (0.1)
LOS, mean (SD)	4.6 (6.0)	5.3 (10.3)	213 (5.7)	2.2 (3.3)
Morbidity, N (%)	NA	NA	213 (5.7)	213 (5.7)

ACS-NSQIP: American College of Surgeons- National Surgical Quality Improvement Program; ASA-PS: American Society of Anaesthesiologists physical status; LOS: length of stay.

It is important to note that the reduction of bed-days, in addition to increasing efficiency of the work of the department, has another side – the minimum increase in the average time spent in hospital (11.9 days vs. 13.1 days) in the case of simultaneous surgical interventions does not significantly increase the risk of internal hospital infection, at that time as a stage treatment doubles it, in the case of two pathologies (as a result – two hospitalizations).

Most often such simultaneous interventions are performed:

– laparoscopic cholecystectomy in the case of gallstone cholecystitis and choledochoscopy with the removal of concrement from the bile duct;

– laparoscopic cholecystectomy in the case of gallstone cholecystitis and hernioplasty;

– laparoscopic cholecystectomy in the case of gallstone cholecystitis and ovarian cystectomy;

– laparoscopic cholecystectomy in the case of gallstone cholecystitis and adhesio- and viscerolysis in the case of adhesive disease of the peritoneum and pelvic cavity;

– hernioplasty and viscerolysis in the case of adhesive disease of peritoneum and pelvic cavity;

– laparoscopic cholecystectomy in the case of gallstone cholecystitis and adhesio- and viscerolysis in the case of infertility;

– laparoscopic cholecystectomy in the case of gallstone cholecystitis and sterilization by intersection of the fallopian tubes;

– laparoscopic ovarian cystectomy and appendectomy in the case of chronic appendicitis;

– laparoscopic ovarian cystectomy and bilateral tubectomy in the case of hydrosalpinx;

– laparoscopic ovarian cystectomy and hysteroscopy with polypectomy or resection of hyperplastic endometrium;

– laparoscopic hernioplasty (TAP, TEPP) and laparoscopic cholecystectomy.

Laparoscopic resection of the liver is in the case of hemangiomas, intrahepatic duct tumors, liver cystic fenestration, abscess drainage, imposition of choledocho-duodenum anastomosis, pancreatic-eunome anastomosis, resection of the stomach, resection of the intestine are performed much less frequent.

1. Implementation of simultaneous operations does not provide additional threats in terms of mortality, anesthetic or surgical complications.

2. The benefits of one-step treatment are unquestionable:

a) facilitation of the patient's life by simultaneously solving two or more diseases without waiting for their exacerbations or complications.

b) reducing the total time of treatment and the level of internal hospital complications that increases with each hospitalization.

c) inappropriate implementation of the stage treatment of some pathologies with the possibility of simultaneous treatment (umbilical hernia, ventral hernia, chronic gallstone cholecystitis).

d) significant material and administrative advantages of simultaneous operations.

e) high compliance of patients (in connection with the above-mentioned factors, as well as psychological reluctance of patients to apply to the hospital for several times)

3. Treatment of pathologies of several organs or systems at the same time is possible with one or with the involvement of several surgical brigades, and, as a rule, does not require expansion of operational access.

4. Execution of open surgical interventions is justified only with the impossibility of using endovideosurgery.

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Волинська обласна клінічна лікарня

СИМУЛЬТАННІ ХІРУРГІЧНІ ВТРУЧАННЯ

Жовчнокам’яна хвороба (ЖКХ) є дуже поширеною хірургічною патологією та часто комбінується з іншими захворюваннями хірургічного профілю. Тактика лікування у випадку комбінованої чи поєднаної патології залежить від багатьох обставин, але найбільш доцільно провести одноетапне лікування. Пріоритетним є використання техніки ендовідеохірургії. Огляд різних джерел дозволяє провести мета-аналіз. Висновки однозначні – симультанні операційні втручання не несуть додаткових ризиків, збільшують ефективність лікування, зменшують ризик післяопераційних внутрішньогоспітальних ускладнень.

Ключові слова: симультанні; сполучені; поєднані; комбіновані; хірургія; операції; ЖКХ; холецистит; холедохолітіаз; ендовідеохірургія; лапароскопія; ризики; мета-аналіз.

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Волынская областная клиническая больница

СИМУЛЬТАННЫЕ ХИРУРГИЧЕСКИЕ ВМЕШАТЕЛЬСТВА

Желчнокаменная болезнь (ЖКБ) является очень распространенной хирургической патологией и часто комбинируется с другими заболеваниями хирургического профиля. Тактика лечения в случае комбинированной или сопряженной патологии зависит от многих обстоятельств, но наиболее целесообразно провести одноэтапное лечения. Использование техники эндовидеохирургии является приоритетным. Обзор различных источников позволяет провести мета-анализ. Выводы однозначны – симультанные операционные вмешательства не несут дополнительных рисков, увеличивают эффективность лечения, уменьшают риск послеоперационных внутригоспитальных осложнений.

Ключевые слова: симультанные; соединенные; комбинированные; хирургия; операции; ЖКБ; холецистит; холедохолитиаз; эндовидеохирургия; лапароскопия; риски; мета-анализ.