Gastrointestinal injurious insults in gynecological surgical procedures at El Sahel Hospital

Gynecology and Women's Health Care Research Article

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Abstract

Background: *Gastrointestinal surgical insults during operative gynecologic procedures varies considerably according to the procedure. Prognostic tools and risk factors should be elucidated by further research efforts to enhance management levels of those cases category.*

Aim of the work: *To investigate the risk factors, impact and severity as regards gastrointestinal injuries during gynecological and obstetrical operations.*

Methodology: *A retrospective case-control research study performed on cases who have underwent gynecologic surgery in the period between 2014 and 2019.*

Results: *Risk factors for gastrointestinal injuries in which past history of abdominal operation , pelvic adhesions, previous pelvic operation have shown to be statistically significant risk factors for GIT injuries (p values <0.001),furthermore ovarian malignancy and staging have been statically significant risk factors affecting the occurrence of GIT injuries in gynecological procedures (p values=0.007, 0.019, consecutively)*

Conclusions and Recommendations: *Innovation of a surgical prognosis algorithm based on statistical analysis is considered the cornerstone of enhancement of surgical management of gynecologically challenging cases aiding in reducing gastrointestinal surgical insults within gynecological surgical practice.*

Introduction

Gastrointestinal injuries during gynecological operations whether open or laparoscopically is a challenging clinical case scenario necessitating proper diagnostic protocol to avoid delayed diagnosis and arousal of morbidity and mortality issues [1].

The incidence of intestinal injuries varies considerably according to the procedure whether dilatation and curettage and trocar injuries. Simple repair by primary closure is considered enough in many case scenarios however sometimes there is more extensive injuries requiring resection and anastomosis that is well known to be a lifesaving procedure [2].

On the other hand, a comprehensive and detailed knowledge of gastrointestinal anatomy with expected adhesions in cases with prior surgical interventions could raise the surgeon's meticulousness to and cautiousness in avoidance of iatrogenic injuries to the gastrointestinal tract. Prognostic tools for gastrointestinal injuries are technique and the type of surgery, prior gastrointestinal and /or pelvic surgery. Cases having a prior history of diverticulitis and pelvic inflammatory disease may have raised risk for intraoperative iatrogenic intestinal injuries [3].

Small intestinal injuries occur in around 75% of cases, whereas 25% of cases injuries affect the large intestine and rarely within gastric area. Interestingly research data available about medical and surgical risk factors predisposing to gastrointestinal injuries are scarce [4].

Aim of the work

To investigate the risk factors, impact and severity as regards gastrointestinal injuries during gynecological and obstetrical operations.

Methodology

A retrospective case-control research performed on cases who have underwent gynecologic surgery from 2014 to 2019. A gastrointestinal injury has been defined as an avulsion, laceration, incision, transection or a thermal insult to viscera diagnosed intraoperatively or suspected by imaging investigations within post-operative period. The data correlated to clinical outcome has been recorded, e.g. injury site, diagnosis time, repair technique. Research data have been obtained from the medical recording system, e.g. age, body mass index (BMI), surgical history, infection of the pelvis, adhesions, surgical technique of operations performed, how much blood loss and the hospital admission period.

Statistical analysis

Data have been collected, checked, coded and assembled to the statistical package for social science (SPSS) Version 23. Qualitative data have been assembled as numbers and percentages and compared by Chi-square test and/or Fisher exact test only if the expected count found less than [5]. The quantitative data have been presented as mean, standard deviations and ranges for parametric data and compared by using Independent t-test plus median with inter-quartile range (IQR) for non-parametric data and compared using Mann-Whitney test. Univariate logistic regression analysis has been used to assess the independent risk factors of GIT injuries during gynecologic operations followed by multivariate analysis using backward (Wald) method. The confidence interval has been set to 95% and the error margin accepted has been set to 5%. Hence, the p-value has been considered significant at the level of < 0.05.

Results

	Small intestine		Large intestine		Rectum	
	No.	%	No.	%	No.	%
Open surgery						
Transabdominal hysterectomy or myomectomy	2	4.0%	1	2.0%	3	6.0%
Transabdominal hysterectomy with adnexal operation	9	18.0%	6	12.0%	4	8.0%
Adnexal operation	3	6.0%	2	4.0%	2	4.0%
Surgical staging	7	14.0%	6	12.0%	3	6.0%
Laparoscopic surgery						
Hysterectomy or myomectomy	0	0.0%	0	0.0%	0	0.0%
Hysterectomy with adnexal operation	1	2.0%	1	2.0%	0	0.0%
Adnexal operation	0	0.0%	0	0.0%	0	0.0%
Total	22	44%	16	32%	12	24%

Table 1 : Type of gynecological procedure in patients with gastrointestinal injuries

Table (1) displays the category of gynecological procedures performed among cases having gastrointestinal injuries in which transabdominal hysterectomy or myomectomy 2 cases had small bowel injuries, 1 case had colonic injury, and 3 cases had rectal injuries, whereas transabdominal hysterectomy with adnexal operation 9 cases had small bowel injuries, 6 cases had colonic injuries, 4 cases had rectal injuries, furthermore adnexal procedures performed 3 cases had small bowel injuries, 2 cases had colonic injuries and 2 cases had rectal injuries, surgical staging procedures involved 7 cases with small intestinal injuries, 6 cases had colonic injuries, 3 cases rectal injuries.

As regards laparoscopic procedures only 1 case of small bowel injury and 1 case of colonic bowel injury in hysterectomy with adnexal operation. Totally 22 cases had small intestinal injuries representing 44 %, 16 cases had colonic injuries representing 32 %, and 12 cases had rectal injuries representing 24% of cases with gastrointestinal injuries.

Table 2 : Demographic data of cases and control research groups

	Cases group	**Control group**	Test value	P-value	Sig.
	No. = 50	**No. = 200**			
Ag in years, mean±SD	45.3 ± 9.6	43.8± 8.4	1.097*	0.273	NS
BMI, mean±SD	24.2±2.3	23.89±2.4	0.824*	0.411	NS
Parity, median (IQR)	2 (1 - 3)	1 (1 - 3)	1.085•	0.341	NS
Mass size (cm), mean±SD	9.4±3.5	10.1±2.4	1.668*	0.097	NS
Previous history of PID	1 (2.0%)	6 (3%)	0.147‡	0.701	NS
Approach of surgery			1.276‡	0.258	NS
Open	48 (96.0%)	197 (98.5%)			
Laparoscope	2 (4.0%)	3 (1.5%)			
EBL (ml), Median (IQR)	485 (370 – 715)	225 (130 – 450)	4.314•	<0.001	HS
LOS, Median (IQR)	7 (5 – 9)	5 (4 – 6)	2.584•	0.009	S

*: Independent t-test; •: Mann-Whitney test; ‡: Chi-square test LOS: Length of stay

Table (2) reveals and displays that the total cohort involved 50 cases and 200 control research groups in which age, body mass index (BMI), parity, size of the mass, prior history of pelvic inflammatory disease (PID), surgical approach (p values=0.273, 0.411, 0.341, 0.097, 0.701, 0.258, consecutively) on the other hand estimated blood loss (EBL), length of hospital stay (LOS) have been statistically significantly higher in case group (p values <0.001,0.009 consecutively).

Table 3: Risk factors for gastrointestinal injuries during gynecological operations

	Cases group		Control group		P-value*	OR (95% CI), p-value	
	No.	%	No.	%		Univariate,	Multivariate
Previous abdominal surgery	9	18.0%	5	2.5%	<0.001	**8.561 (2.7272 to 26.8734), <0.001**	**7.2 (1.885 – 27.495), <0.001**
Pelvic adhesion,	41	82.0%	57	28.5%	<0.001	**11.428 (5.2177 to 25.0340), <0.001**	**40.8 (15.038 – 110.692), <0.001**
Previous pelvic surgery	23	46.0%	12	6.0%	<0.001	**13.346 (5.9598 to 29.8845), <0.001**	
Diagnosis							
Ovarian cancer	16	32.0%	30	15.0%	0.005	**2.667 (1.3114 to 5.4226), 0.007**	
Endometrial cancer	2	4.0%	6	3.0%	0.719	1.3472 (0.2636 to 6.8845), 0.720	
Cervical cancer	1	2.0%	1	0.5%	0.286	4.0612 (0.2496 to 66.0830), 0.325	
Adenomyosis	6	12.0%	29	14.5%	0.648	0.8041 (0.3143 to 2.0572), 0.649	
Endometriosis	12	24.0%	29	14.5%	0.104	1.8621 (0.8717 to 3.9779), 0.108	
Ovarian mass	8	16.0%	28	14.0%	0.718	1.1701 (0.4976 to 2.7516), 0.719	
Uterine fibroid	11	22.0%	60	30.0%	0.261	0.6581 (0.3158 to 1.3715), 0.264	
Type of operation							
Surgical staging	17	34.0%	37	18.5%	0.017	**2.2695 (1.1435 to 4.5039), 0.019**	**0.104 (0.036 – 0.304), <0.001**
Hysterectomy with SO	20	40.0%	62	31.0%	0.225	1.4839 (0.7822 to 2.8149), 0.227	
Hysterectomy	6	12.0%	45	22.5%	0.099	0.4697 (0.1881 to 1.1731), 0.106	
Myomectomy	0	0.0%	12	6.0%	0.075	0.1493 (0.0087 to 2.5651), 0.189	
SO	6	12.0%	13	6.5%	0.189	1.9615 (0.7062 to 5.4483), 0.196	
Cystectomy	4	8.0%	20	10.0%	0.667	1.9615 (0.2550 to 2.4017), 0.668	

***: P-value of Chi-square test**

Table (3) reveals and displays the risk factors for GIT injuries in which prior abdominal surgery, pelvic adhesions and prior pelvic operation have shown to be statistically significant risk factors for GIT injuries (p values <0.001), furthermore ovarian malignancy and staging have been statically significant risk factors affecting the occurrence of GIT injuries in gynecological procedures (p values=0.007, 0.019, consecutively).

Discussion

Gastrointestinal surgical insults during operative gynecologic procedures are not common; however, it could cause considerable morbidity and mortality issues. Late diagnosis of GIT injury could end with abdominal pain, nausea, hyperpyrexia, sepsis or death by a mortality rate of 21%. A prior research study, the 10-year GI injuries incidence in gynecologic surgery have been estimated

to be around 0.38%. The cornerstone risk factors correlated to bowel injury was prior abdominal surgery, pelvic adhesions. The only approach to reduce and minimize gastrointestinal iatrogenic injuries and avoid missed injuries is the meticulous abdominal examination, gentle tissue dissection and prediction of elevated risk level in cases with prior abdominal operative interventions. Minimal invasive gynecological procedures have been more prevalent with better precise techniques and instrument utilization to avoid occult visceral iatrogenic injurious insults [5, 6].

Intraabdominal incidence of adhesion after the open operation have been statistically estimated from prior research studies to be around 30 to 90% furthermore intestinal injuries were observed to occur in around 13.4% of cases having gynecologic laparoscopy with history of laparotomy. The requirement for surgical performance of adhesiolysis could justify the cause for the high injury rate observed (furthermore difficult approach of the abdominal cavity, especially in previous abdomino-pelvic surgical interventions). Also, the adhesions between the scar and underlying viscera are an adverse event of previous abdominal surgery [7, 8].

A prior descriptive retrospective research study, in which 25 cases with gastrointestinal injuries during gynecological procedures research data was statistically analyzed the research team of linvestigators revealed and displayed that the mean +/-SD age of cases = 33.2 ± 7.57 yrs. 44% of research study subjects recruited had an abdominal wall scar. 32% of all gastrointestinal surgical injuries happened while performance of total abdominal hysterectomy, the small intestine has been injured in 36% of cases. 52% of injuries have been successfully detected intraoperatively and the mean+/-SD diagnosis time of injury = 2.8 ± 0.9 days. The research investigators observed the conclusion that all gynecologists should be aware of GIT injuries and expect injury to those organs, particularly in surgically challenging high-risk cases to reduce morbidity issues among those categories of cases [9, 10].

Furthermore, prior clinical research studies, GIT injury incidence while doing gynecologic surgery was in between 0.05% and 0.7%, another research have shown that occurrence of intestinal injury because of laparoscopy was about (0.05%) like the current research study results. Interestingly prior researchers have observed that gastrointestinal injuries have occurred less frequently in laparoscopic surgery than in open surgical procedures (98% versus 2%), those results could be justified that surgeons could convert from laparoscopic surgery to open surgery in surgical scenarios of extensive adhesions and less probability of intestinal manipulation while using laparoscopy than in open surgery. Interestingly it was observed by various research studies previously performed that the gastrointestinal injury site relies on the operation type [11, 12].

A similar study to the current one in approach and methodology have assessed that the most frequent injury site in the bowel have been the small intestine (43.3%), which shows great similarity to the current study results. Additionally, it has been observed and displayed that most surgical injuries have been minor. Interestingly speedy GI injury diagnosis within intra-operative time period carries good prognosis when corrective management is performed without delay [13].

Interestingly prior researchers have observed in a considerable fashion that the incision type had a cornerstone in gastrointestinal surgical insults. History of abdominal surgery raised the probability of gastrointestinal surgical insults more than past pelvic surgery. Advanced age, endometriosis disease, malignant ovarian diseases and staging have been similarly observed in prior research studies to be risk factors for gastrointestinal surgical insults similar to the findings of the current research study. It is crucial to mention that endometriosis and adhesion have a mutual anatomical manipulating feature causing tissue plane alteration making adhesiolysis a risky intervention even when required intraoperatively [3, 12].

Conclusions and Recommendations

Innovation of a surgical prognosis algorithm based on statistical analysis is considered the cornerstone of enhancement of surgical management of gynecologically challenging cases aiding in reducing gastrointestinal surgical insults within gynecological surgical practice.

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