



CODEN [USA]: IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.2537633>Available online at: <http://www.iajps.com>

Research Article

**KNOWLEDGE TOWARDS LAPAROSCOPIC SURGERY FOR
COLORECTAL CANCER AMONG MEDICAL STUDENTS AND
INTERNS IN KINGDOM OF SAUDI ARABIA****Fahad Mohammed Saad Alzahrani¹, Ahmad Abdulqader Ahmad Alzahrani¹, Faisal Adel
Alsquati¹, Althobaiti, Omar Mohammed A¹, Ibrahim Hassan Mohammed Althomali¹,
Adnan Ahmed Alzahrani¹, Fahad Rajallah Alharthi¹**¹College of Medicine, Taif University, Taif city, Saudi Arabia.**Abstract**

Background: According to the World Health Organization (WHO), colorectal cancer (CRC) is the third most common cancer diagnosed among men, and the second most common in women. Yet more awareness is still required about this illness. Colorectal cancer treatment depends on the stage of the disease including radiation, ablation, chemotherapy or endoscopic treatment.

Objective: The aim of this study is to investigate the level of knowledge towards laparoscopic surgery for colorectal cancer among medical students and interns in Kingdom of Saudi Arabia.

Methods: This is a multicenter, cross-sectional observational study. Data was collected using an online designed questionnaire distributed, via a link to Google forms, to medical students and interns in Kingdom of Saudi Arabia. The questionnaire included some questions about; age, sex, level of education and the name of university in addition to assessment questions about laparoscopic surgery medical knowledge. Data were analyzed using Statistical Package for Social Sciences version (SPSS).

Results: Number of participants was 106 (50% of each gender) with a mean \pm SD age of 24.5 ± 1.7 years. Around 63.2% of the participants were interns and 36.8% were students from different universities in Kingdom of Saudi Arabia. The largest proportion of the participants (38.7%) was from Taif University. Upon analysis of the questionnaire answers, the data revealed a median (IRQ) total score of 6(2) points out of 10 points.

Conclusion: Although the participants tended to answer questions correctly more often, the level of knowledge about laparoscopic colorectal cancer surgery among students and interns in Saudi Arabia is considered to be moderate. There is a need to improve the level of knowledge about this management technique which will eventually ensure a better quality of care for the patients.

Key words: Colorectal cancer, Laparoscopic surgery, Knowledge, Saudi Arabia.

Corresponding author:**Fahad Mohammed Saad Alzahrani**

dr.alzahrani.f@gmail.com

+966 59 577 5055.

QR code



Please cite this article in press Fahad Mohammed Saad Alzahrani et al., **Knowledge Towards Laparoscopic Surgery For Colorectal Cancer Among Medical Students And Interns In Kingdom Of Saudi Arabia.**, Indo Am. J. P. Sci, 2019; 06(01).

INTRODUCTION:

Colorectal cancer (CRC) is a major cause of morbidity and mortality throughout the world. It is the third most common cancer worldwide(1).Colorectal cancer is a principal cause of cancer death worldwide, cause 693,900 deaths in 2012(2).Colorectal cancer is a malignant neoplasm arising from the lining of the large intestine (colon and rectum)(3). Many risk factors are associated with the occurrence of CRC. Those that an individual cannot control which considered as irreversible include age and hereditary factors. In addition, a substantial number of environmental and lifestyle risk factors; there are modifiable factors which may play an important role in the development of CRC such as; diets high in fat, high meat consumption and low fruits and vegetables intake(1). Symptoms that accompanied with CRC include rectal bleeding, abdominal pain, weight loss, diarrhea, constipation, anemia, change in bowel habits and bloating(4).Colorectal cancer may lead to several complications that the patients would suffer such as; hemorrhage, peritonitis, urinary retention, intra-abdominal organ injury, urinary tract infection, congestive heart failure (CHF) and fistula(5). Methods for CRC diagnosis include CT scan, MRI, positron emission tomography scan(PET), lymph node biopsy and complete blood count(6). As any cancer disease several management ways are available for CRC treatment like radiation, ablation, chemotherapy and surgery(7). Recently, Laparoscopic colorectal surgery has shown many advantages in terms of short term outcomes and has been shown to not compromise oncologic outcomes in colorectal carcinoma. One of these advantages is being safe for elderly patients and very old patients(8). In previous studies series have proven that morbidity from laparoscopic procedures is less than that seen after traditional open surgeries. These include decreased postoperative pain, rapid recovery of gastrointestinal function, shorter hospital stay and less immunosuppression(9).

In united States of America the incidence of the CRC are considered to be with highest rates worldwide, this results in high improvement in CRC disease investigation methods and the medical care, but yet CRC awareness about the disease and early discovering it are highly recommended to be enriched (2).

In Saudi Arabia number of colorectal cancer patients according to previous Saudi study; is increasing through years to count 1033 new cases of CRC per

year. Colorectal cancer presents at a younger age in Saudis, especially in women. The survival rate is lower compared with developed countries that may be because of lack of screening, a higher proportion of advanced stage cancer at presentation, lack of specialized care outside the major cities and a higher proportion of rectal cancer case(10).

General knowledge about CRC in Saudi Arabia was below acceptable range for awareness that would help the society in treating and preventing the disease. A national education/screening program demonstrated in previous study that Saudi Arabia is recommended to improve CRC knowledge for the public(11). Also, in different segments in the American society knowledge about CRC causes and prevention remedies is considered to be low especially among Filipino, Hmong, and Korean individuals. However, health care access, not knowledge or beliefs, was found to be a key aspect of CRC screening(12). In other American study held in national probability sample consisted of 3,131 adults (53.6% female, 77.9% White) , low rates of colon cancer screening knowledge in the general population was found(13).

About knowledge of CRC between medical students who are physicians for the future, studies had been done in different countries assessed their knowledge. In Greek previous study on three hundreds medical students results showed further need for information and awareness about CRC and colonoscopy screening(14). Similarly at Kasturba Medical College, Mangalore, India a cross sectional study on final year medical students and interns revealed there is a need to improve participant's knowledge regarding CRC screening although majority of them are aware of CRC symptoms and risk factors(15). Same condition was found in Saudi Arabia among higher awareness is needed even for medical students and interns; one of the studies that demonstrated that was conducted at the King Abdul-Aziz University, Jeddah, Saudi Arabia for students from different faculties including medicine college. A this study a conclusion of knowledge and awareness of students about CRC were not up to the mark. Medical students and female students had better knowledge in a few areas, but the overall situation is in need for enhancement(16). All this previous data urges for making more research about the level of knowledge and awareness that the medical students and interns have about CRC diagnosis, prevention and treatment as they will be the promising physicians who shall save our lives.

This cross-sectional study objective is to investigate knowledge towards laparoscopic surgery for colorectal cancer among medical students and interns in Kingdom of Saudi Arabia. We aim with this study to highlight the extent to which this knowledge is being utilized in order to plan and perform a bundle of preventive measures.

SUBJECTS AND METHODS:

Study design: This was a multicenter, cross-sectional observational study. An online designed questionnaire was distributed, via a link to Google forms, to medical students and interns in the Kingdom of Saudi Arabia. Only the participants who filled the questionnaire were included in the analysis. **Statistical analysis:** Data was represented using descriptive statistics of counts and valid percentages for categorical data. Mean, standard deviations (SD), minimum and maximum values were used for parametric numerical data while non-parametric data were described using the median and Inter-quartile range (IQR). Student's t-test was used to compare between the parametric data in the subgroups while non-parametric data was compared using Kruskal Wallis test. P values <0.05 were considered to be

statistically significant. All statistical calculations were done using computer program IBM SPSS (Statistical Package for the Social Science; IBM Corp, Armonk, NY, USA) release 21 for Microsoft Windows.

Subjects:

A total of 106 medical students and interns from different universities in Kingdom of Saudi Arabia (including 53 males and 53 females) who filled the questionnaire were included in the analysis.

Data collection methods and procedure:

Data was collected using a self-administered electronic questionnaire. The questionnaire was consisted of two sections; participants' characteristics including age, gender, level of education (student/intern) and university name were collected.

Participants' knowledge about laparoscopic surgery for colorectal cancer had been assessed by 10 questions. One point was awarded for each correct answer, while no points were awarded for incorrect answers or unanswered questions. The questions are mentioned in Table (1).

Table (1): Questions included in the questionnaire to assess the level of knowledge towards laparoscopic surgery among medical students and interns in Saudi Arabia

Q.1	Studies indicate a faster return to normal lung functioning for laparoscopic patients compared to who had open surgery
Q.2	There is shorter hospital stay for laparoscopic patients compared to who had open surgery,
Q.3	Post-operative complications and wound infections is found to be significantly more in laparoscopic patients compared to who had open surgery
Q.4	Laparoscopic surgeries result in maximal exposure of the visceral contents lesser retraction and handling of bowel compared to who had open surgery
Q.5	The smaller incision for laparoscopic procedures versus laparotomy incisions meant lesser pain and analgesia requirements
Q.6	Research shows patients who had been operated using laparoscopic procedures passed stools earlier and resumed diet earlier as compared on whom open surgeries were performed
Q.7	Slower return to normal physical activity is shown after laparoscopic surgery compared to who had open surgery
Q.8	Operating time is longer in laparoscopic resection for colon cancer compared with open resection
Q.9	Bleeding from the inferior mesenteric artery is a complication of laparoscopic colorectal surgery
Q.10	Port hernia is a complication of laparoscopic colorectal surgery.

RESULTS:

Participants' characteristics

A total of 106 interns and students responded to the questionnaire. They were 53 females and 53 males (50% for each gender). The participants were within the age range of 21 – 31 years with a mean± SD value of 24.5± 1.67.

Most of our participants (63.2%) were interns while medical students constituted (36.8%) of the population. The participants were from different universities in Saudi Arabia the largest category was from Taif university (38.7%) followed by Imam Abdul-Rahman Ibn Faisal university (10.4%) then King Khaled university (9.4%) and other universities.

Level of knowledge about laparoscopic colorectal cancer:

When asking about the recovery of the patients after laparoscopic surgery compared to those who went through open surgery to reach normal lung function, the answer was true among 62.3% (correct answer) of the contributors that thought that laparoscopic has faster return rate.

Regarding hospital stay period after laparoscopic a question was asked about is there shorter hospital stay for laparoscopic patients compared to who had open surgery. Answer came along with True by 88.7% of the participants who thought that laparoscopic surgery needs less time to recover in order to that shorter stay period in hospital is required.

While asking about wound infections that happened after laparoscopic whether it is higher than happened after open surgery; 88.7% of the participants answered with False as their opinion was no much infection with laparoscopic.

One of the questionnaire inquiries was asking about the knowledge of the effect of laparoscopic surgery on visceral contents retraction and handling of the bowel. Upon analysis of the supplied answers about half proportion of the participants replied with False (51.9%) who answered this question correctly.

About smaller incision caused by laparoscopic in comparison to open surgery 79.2% answered with true which is the right answer.

A question stated that research shows patients who had been operated using laparoscopic procedures passed stools earlier and resumed diet earlier as compared on whom open surgeries were performed.

Only 51.9% of the participants replied in this question with True which is the correct answer.

Regarding returning to normal activity state, 62.3% of the participants mentioned false for laparoscopic surgery to provide slower return which is the correct opinion.

Operating time is longer in laparoscopic resection for colon cancer compared with open resection. A small portion of participants, about 34.9%, knew the right answer and replied with true choice.

From analyzing data of our questionnaire only 28.3% of the participants were aware that bleeding from the inferior mesenteric artery is a complication of laparoscopic colorectal surgery.

The last question stated that Port hernia is a complication of laparoscopic colorectal surgery. The response of the participants for this question was inadequate where 31.1% only had answered with True which is the correct answer. More details are provided in tables 2 and 3.

Table (2) Participants' answers to the questionnaire

Questions	True (%)	False (%)	Don't know (%)
Q1 Studies indicate a faster return to normal lung functioning for laparoscopic patients compared to who had open surgery	62.3	7.5	30.2
Q2 There is shorter hospital stay for laparoscopic patients compared to who had open surgery	88.7	1.9	9.4
Q3 Post-operative complications and wound infections is found to be significantly more in laparoscopic patients compared to who had open surgery	6.6	88.7	4.7
Q4 Laparoscopic surgeries result in maximal exposure of the visceral contents lesser retraction and handling of bowel compared to who had open surgery	32.1	51.9	16
Q5 The smaller incision for laparoscopic procedures versus laparotomy incisions meant lesser pain and analgesia requirements	79.5	8.5	12.3
Q6 Research shows patients who had been operated using laparoscopic procedures passed stools earlier and resumed diet earlier as compared on whom open surgeries were performed	51.9	9.4	38.7
Q7 Slower return to normal physical activity is shown after laparoscopic surgery compared to who had open surgery	62.3	29.2	8.5

Q8 Operating time is longer in laparoscopic resection for colon cancer compared with open resection	34.9	27.4	37.7
Q9 Bleeding from the inferior mesenteric artery is a complication of laparoscopic colorectal surgery	28.3	17	54.7
Q10 Port hernia is a complication of laparoscopic colorectal surgery	31.1	15.1	53.8

Table (3) The percentages of correct and wrong answers given to each question.

Questions	Correct answer (%)	Wrong answer/ Don't know (%)
Q1 Studies indicate a faster return to normal lung functioning for laparoscopic patients compared to who had open surgery	62.3	37.7
Q2 There is shorter hospital stay for laparoscopic patients compared to who had open surgery	88.7	11.3
Q3 Post-operative complications and wound infections is found to be significantly more in laparoscopic patients compared to who had open surgery	88.7	11.3
Q4 Laparoscopic surgeries result in maximal exposure of the visceral contents lesser retraction and handling of bowel compared to who had open surgery	51.9	48.1
Q5 The smaller incision for laparoscopic procedures versus laparotomy incisions meant lesser pain and analgesia requirements	79.5	20.5
Q6 Research shows patients who had been operated using laparoscopic procedures passed stools earlier and resumed diet earlier as compared on whom open surgeries were performed	51.9	48.1
Q7 Slower return to normal physical activity is shown after laparoscopic surgery compared to who had open surgery	62.3	37.7
Q8 Operating time is longer in laparoscopic resection for colon cancer compared with open resection	34.9	65.1
Q9 Bleeding from the inferior mesenteric artery is a complication of laparoscopic colorectal surgery	28.3	71.7
Q10 Port hernia is a complication of laparoscopic colorectal surgery	31.1	68.9

DISCUSSION:

Cancer has become a major burden on the health care systems worldwide. Its treatment loads highly sophisticated expertise and mobilization of huge resources. Cancer also has a great impact on the social and economic lives of affected individuals. Since the first report of the Saudi Cancer Registry in 1994, the incidence of all cancers, including colorectal, has steadily increased(10).

The aim of this study was to investigate the level of knowledge towards laparoscopic surgery for colorectal cancer among medical students and interns in Kingdom of Saudi Arabia. This was a multicenter, cross-sectional observational study. Data was collected using an online designed questionnaire distributed, via a link to Google forms, to medical

students and interns in Kingdom of Saudi Arabia. A total of 106 interns and students responded to the questionnaire. They were 53 females and 53 males. The participants were within the age range of 21 – 31 years with a mean± SD value of 24.5± 1.67.

In the current study only 62.3% of the contributors that thought that laparoscopic has faster return rate. This finding supports that laparoscopic may have the advantage over the open surgery in returning the pulmonary functions in less time. In agreement with this opinion a previous study published on 2008 concluded that postoperative pulmonary function is better preserved after laparoscopic cholecystectomy than open cholecystectomy which a surgery that similar to colorectal cancer endoscopy(17). In

another study a non-significant difference was found between laparoscopic surgery and open resection in pulmonary functions where both had the same results(18). Asking for if laparoscopic surgery need less time to recover in order to that shorter stay period in hospital is required, 88.7% of the participants who thought that. This obtained data came in agreement with previous studies which demonstrated that laparoscopic surgery provides short-term advantages, including a shorter hospital stay, reduced analgesic use and faster recovery of intestinal function(19). On the other hand, other previous studies investigated different results; at which it reported regarding the length of postoperative hospital stay, There was no significant difference in the length of postoperative hospital stay between laparoscopic and open surgery(20). This work also revealed that wound infections that happened after laparoscopic is lower than happened after open surgery; where 88.7% of the participants answered with correct answer for this inquiry. This opinion is supported by previous study concerned about safety laparoscopic towards elderly patients where it was found that there is a reduction in the incidence of postoperative pneumonia and wound infection with laparoscopic colorectal surgery(21). In our study analysis of data demonstrated that the effect of laparoscopic surgery on visceral contents retraction and handling of the bowel is less than what happened with open surgery and only (51.9%) who answered with correct choice while the rest were unfamiliar with the right information. This information is in agreement with Schwenk et al., who reported that Minimal exposure of visceral contents, less retraction and handling of bowel occur in laparoscopic surgery. This decrease in operative trauma leads to rapid restoration of gastrointestinal motility(22). Relative study was done revealed that the rate of visceral injury with closed technique varied from 0.03% to 0.15% with prevalence of injury to the gastrointestinal tract (80%) greater than that for urinary tract (20%). With the open technique, the same figure varied from 0% to 0.12%(23). Large part of participants 79.2% thought that smaller incision is caused by laparoscopic in comparison to open surgery. In agreement to that a previous study showed the most common complications were post-incisional hernia, cellulitis, and wound infections. The wound complications were significantly lower in the laparoscopy group (2.85% vs. 18.57%, $p=0.002$) than the laparotomy group because of a smaller wound size(24). Also, it was found that Laparoscopic colorectal surgery caused significant less pain for patients, leading to lower need of analgesic

($P=0.002$)(25). Previous study by Salimath et al., reported that first bowel movement took 4.4 days (95% CI 0.19 or 4.2 to 4.6) for open colectomy and 3.7 days (95% CI 0.22 or 3.5 to 3.9) for laparoscopic colorectal surgery(26). Our study data showed that 51.9% of the participants know about this knowledge and confirmed that Laparoscopic surgery recovery is faster retaining the bowel movement and function for earlier stools and resumed diet comparing to open surgery. Among returning to normal activity state 62.3% of the participants mentioned False for laparoscopic surgery to provide slower return which is the right opinion. On other hand in previous study no differences had been found related to physical function recovery after both laparoscopic and open surgery(27). Small portion of participants about 34.9% who knew that laparoscopic surgery consumes more time than open surgery. In agreement to that previous study demonstrated that the operative time was longer in laparoscopic resection group than in open resection group (189 ± 18 min vs 146 ± 22 min, $P < 0.05$) (28). Post-operative bleeding is one of accompanying complication that concurrent laparoscopic surgery(5). From analysis of our questionnaire data only 28.3% of the participants were aware of this data among laparoscopic surgery bleeding complications. One of the common long-term complications for laparoscopic surgery of colorectal cancer treatment is hernia(5). Among this complication the response of the participants in the questionnaire was also imperfect where 31.1% only had answered with True the correct answer.

CONCLUSION:

In conclusion, after complete analysis of frequency and rate of the correct answers the data obtained from participants with average age of 24.5 years with the total score was with Medina (IRQ) 6(2) this indicated that students and interns who were from Saudi Arabia medical Universities have moderate level of knowledge without significant difference between males and females. So much knowledge about CRC laparoscopic surgery are required to be enhanced and improved through many ways like awareness in new curriculum, new practical clinical cases and to be involved in their studying years and before their graduation.

REFERENCES:

1. Hagggar FA, Boushey RP. Colorectal Cancer Epidemiology: Incidence, Mortality, Survival, and Risk Factors. Clin Colon Rectal Surg. 2009; 22(4):191–7.
2. Bhandari A, Woodhouse M, Gupta S. Colorectal

- cancer is a leading cause of cancer incidence and mortality among adults younger than 50 years in the USA: a SEER-based analysis with comparison to other young-onset cancers. *J Investig Med Off Publ Am Fed Clin Res.* 2017; 65(2):311–5.
3. Akhtar R, Chandel S, Sarotra P, Medhi B. Current status of pharmacological treatment of colorectal cancer. *World J Gastrointest Oncol.* 2014; 15;6(6):177–83.
 4. Astin M, Griffin T, Neal RD, Rose P, Hamilton W. The diagnostic value of symptoms for colorectal cancer in primary care: a systematic review. *Br J Gen Pract.* 2011; 61(586):e231–43.
 5. Liu L, Herrinton LJ, Hornbrook MC, Wendel CS, Grant M, Krouse RS. EARLY AND LATE COMPLICATIONS AMONG LONG-TERM COLORECTAL CANCER SURVIVORS WITH OSTOMY OR ANASTOMOSIS. *Dis Colon Rectum.* 2010 ; 53(2):200–12.
 6. Colon Cancer Treatment (PDQ®) - PDQ Cancer Information Summaries - NCBI Bookshelf [Internet]. [cited 2018 Dec 11].
 7. Gelband H, Jha P, Sankaranarayanan R, Horton S, editors. *Cancer: Disease Control Priorities, Third Edition (Volume 3)* [Internet]. Washington (DC): The International Bank for Reconstruction and Development / The World Bank; 2015 [cited 2018 Dec 11].
 8. Lim SW, Kim YJ, Kim HR. Laparoscopic surgery for colorectal cancer in patients over 80 years of age: the morbidity outcomes. *Ann Surg Treat Res.* 2017; 92(6):423–8.
 9. Kahnamoui K, Cadeddu M, Farrokhyar F, Anvari M. Laparoscopic surgery for colon cancer: a systematic review. *Can J Surg.* 2007; 50(1):48–57.
 10. Alsanea N, Abduljabbar AS, Alhomoud S, Ashari LH, Hibbert D, Bazarbashi S. Colorectal cancer in Saudi Arabia: incidence, survival, demographics and implications for national policies. *Ann Saudi Med.* 2015; 35(3):196–202.
 11. Zubaidi AM, AlSubaie NM, AlHumaid AA, Shaik SA, AlKhayal KA, AlObeed OA. Public awareness of colorectal cancer in Saudi Arabia: A survey of 1070 participants in Riyadh. *Saudi J Gastroenterol Off J Saudi Gastroenterol Assoc.* 2015; 21(2):78–83.
 12. Tran MT, Jeong MB, Nguyen VV, Sharp MT, Yu EP, Yu F, et al. Colorectal cancer beliefs, knowledge, and screening among Filipino, Hmong, and Korean Americans. *Cancer.* 2018 Apr 1;124 Suppl 7:1552–9.
 13. Ford JS, Coups EJ, Hay JL. Knowledge of colon cancer screening in a national probability sample in the United States. *J Health Commun.* 2006; 11 Suppl 1:19–35.
 14. Papanikolaou IS, Sioulas AD, Kalimeris S, Papatheodosiou P, Karabinis I, Agelopoulou O, et al. Awareness and attitudes of Greek medical students on colorectal cancer screening. *World J Gastrointest Endosc.* 2012; 16;4(11):513–7.
 15. Kulkarni V, Darshan BB, Unnikrishnan B, Cheng KC, Hui GC, Theng AY, et al. Colorectal Cancer: How Familiar Are Our Future Doctors with the Cancer of Tomorrow? [Internet]. *BioMed Research International.* 2018 [cited 2018 Dec 12].
 16. Imran M, Sayedalamin Z, Alsulami SS, Atta M, Baig M. Knowledge and Awareness of Colorectal Cancer among Undergraduate Students at King Abdulaziz University, Jeddah, Saudi Arabia: a Survey-Based Study. *Asian Pac J Cancer Prev APJCP.* 2016; 17(5):2479–83.
 17. Damiani G, Pinnarelli L, Sammarco A, Sommella L, Francucci M, Ricciardi W. Postoperative Pulmonary Function in Open versus Laparoscopic Cholecystectomy: A Meta-Analysis of the Tiffenau Index. *Dig Surg.* 2008; 25(1):1–7.
 18. Celik S, Yilmaz EM. Effects of Laparoscopic and Conventional Methods on Lung Functions in Colorectal Surgery. *Med Sci Monit Int Med J Exp Clin Res.* 2018; 17;24:3244–8.
 19. Morneau M, Boulanger J, Charlebois P, Latulippe J-F, Loughnarath R, Thibault C, et al. Laparoscopic versus open surgery for the treatment of colorectal cancer: a literature review and recommendations from the Comité de l'évolution des pratiques en oncologie. *Can J Surg.* 2013; 56(5):297–310.
 20. Fujii S, Tsukamoto M, Fukushima Y, Shimada R, Okamoto K, Tsuchiya T, et al. Systematic review of laparoscopic vs open surgery for colorectal cancer in elderly patients. *World J Gastrointest Oncol.* 2016; 15;8(7):573–82.
 21. Grailey K, Markar SR, Karthikesalingam A, Aboud R, Ziprin P, Faiz O. Laparoscopic versus open colorectal resection in the elderly population. *Surg Endosc.* 2013; 27(1):19–30.
 22. Lai JH, Law WL. Laparoscopic surgery for colorectal cancer. *Br Med Bull.* 2012; 1;104(1):61–89.
 23. Toro A, Mannino M, Cappello G, Di Stefano A,

- Di Carlo I. Comparison of Two Entry Methods for Laparoscopic Port Entry: Technical Point of View [Internet]. *Diagnostic and Therapeutic Endoscopy*. 2012 [cited 2018 Dec 16].
24. Bige Ö, Demir A, Saatli B, Koyuncuoğlu M, Saygılı U. Laparoscopy versus laparotomy for the management of endometrial carcinoma in morbidly obese patients: a prospective study. *J Turk Ger Gynecol Assoc*. 2015; 14;16(3):164–9.
 25. Biondi A, Grosso G, Mistretta A, Marventano S, Toscano C, Gruttadauria S, et al. Laparoscopic-Assisted Versus Open Surgery for Colorectal Cancer: Short- and Long-Term Outcomes Comparison. *J Laparoendosc Adv Surg Tech A*. 2013; 23(1):1–7.
 26. Salimath J, Jones MW, Hunt DL, Lane MK. Comparison of Return of Bowel Function and Length of Stay in Patients Undergoing Laparoscopic Versus Open Colectomy. *JLS*. 2007;11(1):72–5.
 27. Basse L, Jakobsen DH, Bardram L, Billesbølle P, Lund C, Mogensen T, et al. Functional Recovery After Open Versus Laparoscopic Colonic Resection. *Ann Surg*. 2005; 241(3):416–23.
 28. Wu W-X, Sun Y-M, Hua Y-B, Shen L-Z. Laparoscopic versus conventional open resection of rectal carcinoma: A clinical comparative study. *World J Gastroenterol*. 2004; 15;10(8):1167–70.