ORIGINAL RESEARCH PAPER

Volume-7 | Issue-3 | March-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

CUSTOMIZED AND COST EFFECTIVE SPECIMEN RETRIEVAL BAG IN LAPAROSCOPIC CHOLECYSTECTOMY: STUDY IN 150 CASES

Surgery

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ABSTRACT

Minimally invasive surgery has undergone rapid development in last decade and it has many advantages but it has a few drawbacks also like difficulty in removing specimen, spillage of contents intraperitoneally and port site infection. Specimen retrieval through trocar site by using laparoscopic retrieval bag is the solution but cost is a barrier in government setups. So our major concern is to make customized Specimen retrieval bags for easy removal of specimen and reducing the rate of port site infection.

KEYWORDS

cost effective, laparoscopic cholecystectomy, endobags, female condoms.

Introduction:

Due to high cost and unavailability of commercially available endobags, it is not feasible to use them every time in laparoscopic surgeries in government setups. In an attempt to reduce costs, we developed customized specimen retrieval bags for laparoscopic cholecystectomy.

Materials and Surgical Technique:

We used female condoms and polyethelene bag of intravenous (I.V) set in total 150 patients of calculous cholecystitis. The polyethylene bag or female condom introduced through epigastric port and Gall bladder specimen removed by putting it into that polyethelene bag or female condom.

Methodology and Surgical Technique:

We made customized specimen retrieval bag by female condoms or polyethelene bag of i.v. set.

In 150 patients operated for laparoscopic cholecystectomy for calculous cholecystitis, we used female condoms in 100 patients and i.v. set bag in 50 patients. Female condom is madeup of latex rubber ,approximately 18-20cm in length and 6-7cm in width, with conical shape and ring at the upper part which is flexible, and it is non collapsible.

Polyethelene bag is a 15 × 7.5-cm plastic bag, which we cut approximately in half (7.5× 4 cm) and then pleat longitudinally and it is collapsible. We inserted the customized specimen retrieval bag in the peritoneal cavity through the 12mm or 15mm port in epigastric region with use of grasper. The gallbladder and stones are then inserted into the bag, the bag is held with a grasping forceps, and removed through the epigastric port under direct vision. We used our customized specimen retrieval bag in 150 patients(50 polyethylene bags and 100 female condoms) undergoing laparoscopic cholecystectomy in our General surgery department, Government medical college surat from September 2015 to September 2017. There was no incident of bile leak, rupture, or accidental opening of the bag during removal from the peritoneal cavity. We sterilized both of these bags before using by the method of Ethlene oxide (ETO) gas sterilization. We have reused these bags for 3-4times after cleaning and sterilizing by ETO if they have not ruptured.

Discussion:

Laparoscopic surgery has evolved greatly over the last 20 years, and laparoscopic cholecystectomy is considered the gold standard for the treatment of symptomatic gallstone disease (4). One major concern regarding advanced laparoscopic operations is the safe extraction of the specimen (1) and port site infection especially in cases where it is fragmented and/or shows signs of infection multiple gall stones or gallbladder perforation, impacted stones. An ideal specimen removal system should fulfill the following qualifications: easily available, easy to insert in peritoneal cavity, easy to handle; easy to hold the edges of bag after putting specimen in it, allow adequate visibility of the surgical field using a minimal number of ports; should not be resistant to manipulation; to remove through 12mm or15 mm port sites, non collapsibility reusability and the most important it should be cost-effective (2,3). During the last 3 years, our hospital has sustained extensive budget cuts due to the ongoing economic crisis; this has resulted in shortages of many surgical instruments, especially those used in laparoscopic procedures. One of the first items that became scarce was commercially available specimen retrieval bags, which, according to market research by our supplies office, cost between 1200 to 1600 rupees. Therefore, cheaper and feasible alternatives had to be found. Various customized specimen retrieval bags have been described in the literature, including condoms, zipper bags, the Nadiad bag , and more often surgical gloves tied in various ways (3,5,10). The use of drain packages has also been described. Each of these bags bears the cost of materials needed to construct the specimen retrieval bag, including sterile gloves, sutures, and ureteral catheters (Nadiad bag). Each of this bags has advantages and disadvantages. In the case of surgical gloves, the talcum powder may promote adhesion formation(5), so it is necessary to rinse them with normal saline prior to being used. A wet glove however may collapse due to irrigation or contact with peritoneal fluid, making it difficult to handle. Finally, gloves carry a low resistance to traction and manipulation, making them prone to tearing. So we have used female condoms and i.v. set bag for specimen retrieval in laparoscopic cholecystectomy. Furthermore, some Figure 1 The FEMALE CONDOM as endobag ready for use. Figure 2 The gallbladder and stones being collected inside the bag. Figure 3 The bag containing the gallbladder is being removed. Figure 4 Whole female condom with Gall bladder inside it. Figure 5 Removal of endobag from port site with specimen in it. We routinely use the polyethelene bag of intravenous set,or female condoms for the operative field after laparoscopic cholecystectomy. According to the manufacturer, the cover of the intravenous catheter is made of polyethylene. Before using it on our patients, we measured the burst pressure of the bag to be about 150 mmHg, which was considered safe for use. We used the polyethylene bag of intravenous catheter in 50 cases and female condoms in 100 cases. There was not a single case of rupture or accidental opening of polyethelene bag or female condoms intraperitoneally. Female condom is madeup of latex rubber ,approximately 18-20cm in length and 6-7cm in width, with conical shape and ring at the upper part which is flexible, and it is non collapsible. Female condom has a ring at upper side which is very easy to handle. Polyethelene bag is a 15 × 7.5-cm plastic bag which we cut approximately half before inserting intraperitoneally. There are cases of damage to the customized bags outside the abdomen during manipulation ans during removal of gallbladder specimen with stones

in it. There are 5 cases in which female condoms have torn, but there was no spillage of bile or stones into the peritoneal cavity. The procedure of preparation of plastic bag of intravenous set and female condoms as specimen retrieval bag is described here. Plastic bag of intravenous(IV) set is cut to approximately half size and it is sent for sterilization by ethylene oxide(ETO)gas sterilization, it takes 12hours for complete sterilization process, and after using it once it can be washed thoroughly with saline, dried and again sterilized by ETO method for reuse for 3- 4 times to cut down the cost of specimen retrieval bag. The procedure of female condom is little bit different. After purchasing female condoms it is washed thoroughly with soaped water because condom contains lubricant over it surface, so after washing it by soaped water from inner and outer side, so it becomes non sticky and smooth latex bag. It contains a ring of soft plastic at fundus region which should be removed every time. Then it is sterilized by ETO method and can be taken for use in laparoscopic cholecystectomy. After removal of specimen it is washed with saline and again reused after sterilization. The learning curve is also very short. Our customized specimen retrieval bag made from the package of the intravenous set seems to be a safe, effective, and easy to use method for specimen extraction in laparoscopic cholecystectomy, and it may serve as an alternative to commercial endobags, but as compared to female condoms, it does not have everted margins for holding it properly during extraction, and its material is slightly resistant to manipulation as compared to latex of female condoms and polyethelene bags are collapsible so it finds difficult intraoperatively to put specimen in it. The female condoms as compared to Iv set bags are more easy to insert , easy to manipulate in peritoneal cavity and very easy to hold the edges of female condoms with use of Universal bowel grasper because of everted margins, and because of latex rubber material it does not get slipped after locking the grasper. Further studies with larger specimen samples need to be conducted and then compared more precisely with the other specimen retrieval systems in order to establish the best possible solution.

Acknowledgments: The authors have no conflicts of interest of financial ties to disclose, and they received no funding this study.

Results:

We have used these customized specimen retrieval bags made by plastic bags of Iv set and bag made by female condoms, and we have found it very useful and extremely cost effective then commercially available endobags. Especially in difficult cholecystectomy like, impacted stones, empyema,thick walled gall bladder it is easy to open gall bladder and extract the stones and put them in customized retrieval bags. It prevents accidental and inadvertant spillage of small stones in peritoneal cavity and prevent contamination also at port sites. It is very easy to handle female condom inside the peritoneal cavity because of the ring at upper margin. Customized endobags can be washed and sterilized easily for reusing purpose. We have compared the costs of commercially available specimen retrieval bags and our customized bags and we have found it extremely cost effective. There are chances of port site infection after laparoscopic cholecystectomy because of spillage of bile or small stones during removal of gallbladder from port site without usage of endobags. In our study of 150cases there is not a single case of port site infection noticed.

BAG	COMPANY	COST(approx.)
Endo pouch	Ethicon	1800rs
Endocatch	Ethicon	4000rs
Pleatman sac	Abbott	1800rs
Nadiad bag	Nadiad,india	200rs
FEMALE CONDOM	Home made	100rs
IVSET BAG	Home made	50rs

Conclusion:

After using this customized retrieval bags in 150 patients, we have come to know that customized specimen retrieval bags are equally effective in laparoscopic cholecystectomy as commercially available endobags. So we can use these customized bags instead of commercially available endobags and we can cut down the cost of surgery effectively.

There are no leakage rate intraperitoneally or no portsite infection rate noticed during our 3 years experience, and it is very easy to handle these customized specimen retrieval bags for beginners also. Benefits of using these specimen retrieval bags are, we can put stones in bag, we can remove gallbladder and stone en-mass, in case of suspected empyema of gallbladder because we can prevent direct contact of gall badder wall to skin and we can prevent spillage of bile and stones intraperitoneally.



Figure 1



Figure 2



Figure 3

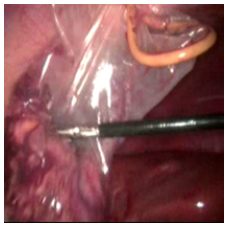


Figure 4



Figure 5

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