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Laparoscopic retrieval of retained intraperitoneal drain in the immediate postoperative period

Report of two cases

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Nicola Carlomagno*, Michele Santangelo**, Sebastiano Grassia*°, Cristina La Tessa*, Andrea Renda*

Università degli Studi di Napoli "Federico II", Napoli, Italy
**Chirurgia generale ad Indirizzo addominale (Direttore: Prof. A. Renda)*
***Chirurgia dei Trapianti (Direttore: Prof. A. Renda)*
°Dottorato di Ricerca in Scienze Chirurgiche e Tecnologie Diagnostico-Terapeutiche Avanzate (Coordinatore: Prof. A. Renda)

Laparoscopic retrieval of retained intraperitoneal drain in the immediate postoperative period. Report of two cases

AIM: *The purpose of this study is to analyze a "rare" complication on the management of abdominal surgical drains: abdominal drainage's retention. Starting from our experience we reviewed literature on this topic*
MATERIAL OF STUDY: *We report two cases (occurred on 2004 and 2010) of retained intraperitoneal drain occurred in the immediate postoperative period after laparoscopic cholecystectomy.*
RESULTS: *Both patients were successfully treated by early laparoscopic removal.*
DISCUSSION: *We compared our experience with literature. Incidence, ethiology, prevention, diagnosis and treatment of this rare complication are analysed. We also considered the guidelines in the placement of intraperitoneal drains, the different fixation techniques, the causes of fragmentation of the drainage and removal techniques.*
CONCLUSIONS: *Retained intraperitoneal drain secondary to fracture and adhesion in the immediate postoperative period is rare but probably underestimated surgical complication. It is impossible to know its real incidence. The role of laparoscopy is emphasized because this approach is cosmetically acceptable, contributes to early recovery and discharge of the patient, and helps to lessen the friction in worsening doctor-patient relationship.*

KEY WORDS: Abdominal drainage, Drain-related complications, Laparoscopy, Retained intraperitoneal drain

Introduction

Retained intraperitoneal drain secondary to fracture and adhesion in the immediate postoperative period is rare but real possibility. It is often under-reported for fear of medico-legal complaints. Previous management of such cases involved a return to the operating room and retrieval either by wound exploration or re-laparotomy. In recent times, surgical procedures being done by laparoscopy have enormously expanded in kinds and numbers. We would like to present two patients with disappeared abdominal drain in the immediate postoperative period who were managed by laparoscopy.
Even though most of the scientific production prefers to highlight new surgical techniques or series without complications, we decided to publish this event, although born to a technical error. We considered it a very useful report as a starting point to analyze and prevent errors and to avoid underestimating the problem.

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Correspondence to: Nicola Carlomagno, Via D. Fontana 27 is. 17/18, 80128 Napoli (e-mail: nicola.anita@tiscali.it)

Case report

Two patients, female, aged 25 and 50 years old, were operated on laparoscopic cholecystectomy respectively on May 2004 and on February 2010. At the end of the operation we put a drain on gallbladder bed and we secured it to the skin with a silk stitch. In the first patient on the second day we observed that the drain was disappeared due to the collapse of skin silk suture. In the other one the drain was shortened after 24 hours, but excessively, so it resulted too short out the skin level and was retracted intraperitoneally.
The intraperitoneal presence of the drains was suddenly confirmed by a plan abdomen radiogram. We proceeded to its removal by laparoscopy. A 10-mm trocar was inserted in the umbilicus using an open method and pneumoperitoneum was induced.
In both cases the drainage was soon discovered during laparoscopic exploration. It was free in abdomen without parietal or visceral adhesions (Fig. 1).
In the younger patient it was located just above the liver. We put another 5-mm trocar to insert a grasper on a previous port hole and to pull out the drainage (Fig. 2).

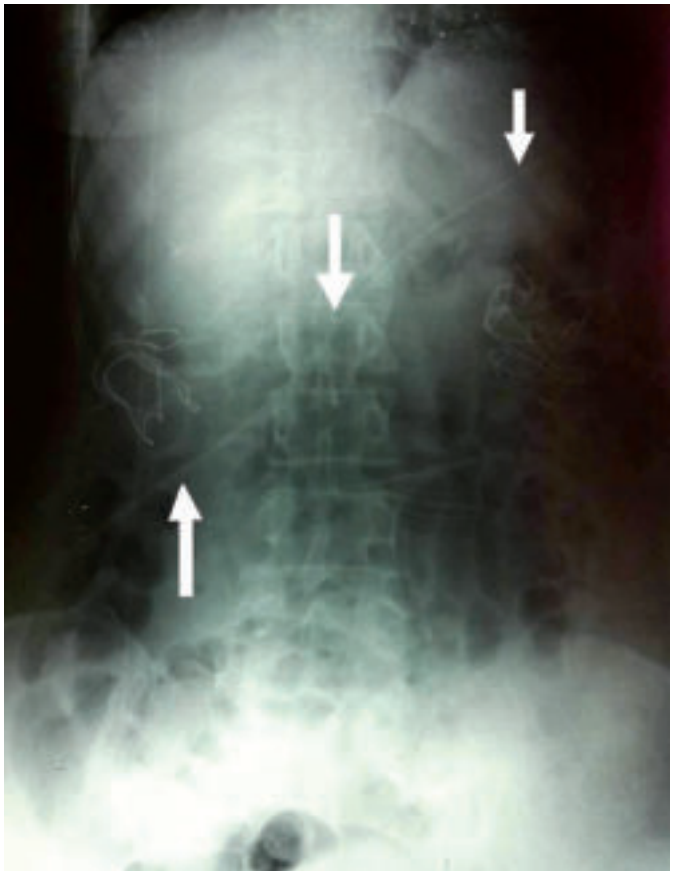

Fig. 1: Case 2: Plan abdomen radiogram. The arrows show the intraperitoneal drain.

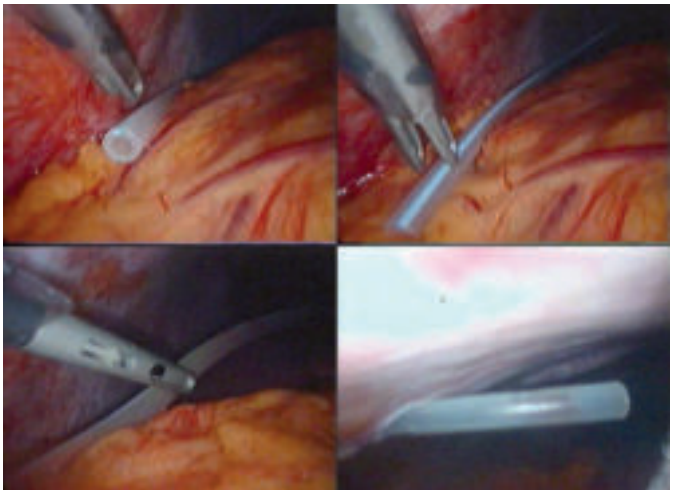

Fig. 2: Case 1 : The "disappeared" drain is detected at laparoscopic exploration and is pulled out with a grasper inserted through a 5 mm port.

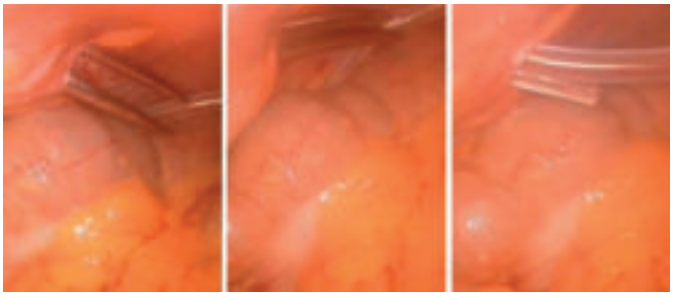

Fig. 3: Case 2 : The "disappeared" drain is detected at laparoscopic exploration and is pulled out with a Kelly forceps.

In the other patient the drain was found very close to the abdominal wall just above the previous 5 mm port hole and it was pulled out by a Kelly forceps inserted through the same incision (Fig. 3).
In both operations the removal was very easy and lasted less than 10 minutes, but it required a general anaesthesia.
At the exploration there were neither fluid collections neither visceral or vascular lesions inside the abdomen, so we did not decide to leave another drain at the end of the procedure.

Results

Both patients were successfully treated by early laparoscopic removal. Postoperative course was regular without pain, bowel disorders or any other kind of complication. Patients were discharged 24 hours after re-laparoscopy.

Discussion

The use of postoperative surgical drains by surgeons is a common procedure and dates back to the time of Hippocrates [1,2]. However their routine use following abdominal surgery still remains controversial so their deployment is generally based on surgeon's previous experiences [3,4].

Usually indication for drainage and drain type choice have been leave to surgeon preference or surgical dogma (such as the commonly heard: "When in doubt, drain") instead of being driven by data.

The aim of our report is not to analyse the utility of drainage: intraperitoneal drainage has been a subject of controversy and debate since the earliest recording of surgical theory and practice but none of qualified meta-analysis studies reported in literature have been conclusive.

We have just tried to analyse one of the rarest drain-related complications: the intraperitoneal loss of drain in the immediate postoperative period, such as occurred in our two patients. The observation of these cases prompted us to review the literature and investigate aspects related to incidence, ethiology, prevention, diagnosis and treatment of this rare complication.

Drain placement is indeed not lacking of complications such as: infection, pain, visceral herniation, haemorrhage, perforation [5,6], irritation to the surrounding structures, fracture, fragmentation or migration [5]. Although retained fragments are not common, the necessity for re-intervention represents a major complication.

It is impossible to know the real incidence of these complications. Certainly there is an underestimation because many incidents are not reported for fear of legal problems.

In any case, when the drain is inserted, it is necessary to make any effort to decrease the drain trouble as much as possible. Such drains can dislodge or retract into the peritoneal cavity and lead to reoperation [7,8].

In literature it is possible to find some case reports about retained drain pieces due to fracture rather than drain migration of the uncut drainage [9,10], such as verified in our two cases.

Although morbidity associated with surgical drains is rare, there have been reports of drain migration leading to fatal outcome [11]. The dislocation of the drainage is always due to surgeon's mistake. Most drains are retained unknowingly. It may occurs if the drain is fractured and retracted intraperitoneally because it was curled, sutured loosely with an unsecured knot or overstretched if any excessive force was used during its removal.

The adoption of a correct surgical technique is the first step to prevent this complication. Some tricks to avoid drain dislocations are well known.

Many techniques of fixation have been described from the use of traditional suture materials to drain attachment devices (Table I) [12].

TABLE I - *Techniques for fixing drains*

'Figure of eight' or lattice[12]
Suturing around a cuff of capillary tube[13]
Suturing through a piece of Elastoplast (Elastoplast flag method) [14,15]
Looping a stay suture through a subcuticular stitch[16]
Adhesive tape as a mesentery to the skin[17]
Drain/tube attachment device[18]
Adhesive tape to secure the suture to the drain[19]
Suturing through the drain holes[20]
Applying longitudinal tension to create waisting upon release[21]

TABLE II - *Guideline for insertion of peritoneal drains*[8]

Do not insert unnecessary drains
Remove the drains at the earliest convenience
The length of skin incision should be identical to the size of the drain size
Suture-fixation of the drain to skin using a round needle with 2-0 nylon throwing five or more non-slip knots at two different places
Leave 5 cm or more of the drain out of the skin level
Do not use safety pins
If the drain must be placed for 1 week or longer, re-fix the drain

Hoya [8] manualized the procedure as 'The Peritoneal Drain Fixation Method' on the basis of surgeons' opinions expressed in a questionnaire survey and a review of the published work [8,16,22,23]. He emphasized a useful guideline for insertion of peritoneal drains (Table II).

Silk or polypropylene sutures are used most often because of their adherence properties. A critical point of this kind of fixation is that if the first knot is not correctly positioned, the drain might be slightly mobile which causes maceration of the skin that surrounds the drain's exit point[7]. Drain mobility can loosen the knot and cause expulsion of the drain, thereby increasing the morbidity of the surgical procedure [23]. Leaving them for any period of time allows for tissue ingrowths around the drain and side holes, causing severe resistance on removal, with eventual breakage and retention [24].

The most prominent site of fracture is at the level of the suture material securing the drain to the abdominal wall [9,25]. Surgical drains are engineered to function to their maximal tensile strength in normal use. Dilatation or creation of new fenestrations in the drain material may serve to compromise the integrity and, therefore, predispose to drain fracture. We agree with Campbell[3] that advises against the modification of surgical drains in order to prevent the morbidity associated with drain fracture.

Whenever drains are shortened, they should either be re-secured with a stitch or with a safety pin [2].
In literature [8] there is also a description of fixation device for the Duple drain, used to strengthen fixation between the suture and the drain and to ensure the drain does not migrate even when the sutures loosen. Another arrangement may be to maintain the drainage always connected to an external collection bag system.
If a drainage loss in abdomen happens during the first postoperative days, the diagnosis of it is very simple. At patient's bed, the surgeon or the same patient can note the disappearance of the drain if it has migrated inside the abdomen. Furthermore, if the drain is fractured at the moment of its removal, the surgeon can see that it is shorter or it does not present the final holes. A plan abdomen radiogram is needed to confirm its presence into the abdomen and mainly to give information about its location in the peritoneal space.
Once occurred, drain migration must soon be treated to avoid potential complications and to prevent a medico-legal litigation.
There are few reports about minimally invasive techniques to remove retained postsurgical drains [24,26,27]: usually patients ended up undergoing re-exploration using formal laparotomy [24].
However review of literature shows some innovative approaches to resolve this iatrogenic complication and to prevent another laparotomy: percutaneous retrieval utilizing C-arm fluoroscopyguided tract exploration with surgical hemostat [10,28], balloon angioplasty through the drain site [29], a novel technique using a rigid cystoscope[1].
Laparoscopy has been described as the means of removing intraabdominal foreign bodies, either intraperitoneal, (i.e.: translocated intrauterine devices [30] or retained surgical sponge [31]) and intraluminal (from stomach or bowel irretrievable by flexible endoscopy) [32].
Using new and advanced instruments, laparoscopic removal of retained drains is feasible and must be considered the treatment of choice.
Laparoscopic retrieval of drainage has been safe and simple in our experience too. Laparoscopic removal is even easier when such complication occurs few days after the operation and adhesions are not present between drainage and omentum or small bowel loops In one of our cases it was just sufficient to use a Kelly forceps because the drainage was very close to the abdominal wall and it was not required to insert another 5 mm trocar for putting a grasper inside the abdomen
A laparoscopic approach is not only cosmetically acceptable, but it also can contribute to early recovery and discharge of the patient helping to lessen the hostility in the recently worsening doctor-patient relationship. Minimum addition of surgical wounds and relative discomfort related to a second laparoscopic procedure, even though it is due to iatrogenic complication, have the effect of decreasing friction and legal suits from the patient and relatives, and, more importantly, the early recovery of patient [24].

Conclusions

Retained intraperitoneal drain secondary to fracture and adhesion in the immediate postoperative period is a rare and probably underestimated complication, also for medico-legal complaints.
Drains are a valuable aid to the surgeon but their management needs attention to reduce its related complications, included retained drain. This is an usually avoidable postsurgical complication particularly when drain is positioned with care and cautions manoeuvres are used to manage and/or remove it.
When the retention occurs during the first postoperative days its diagnosis and treatment is easy.
There are few reports in literature regarding minimally invasive techniques to remove retained postsurgical drains. Laparoscopic removal is a very safe method with no morbidity and mortality and it can elongate the hospitalization time just for 24-48 hours. Furthermore a laparoscopic approach in the management of such iatrogenic complication is very simple, efficacious, and cosmetically acceptable and it contributes to early recovery and discharge of the patient helping to lessen the hostility in the recently worsening doctor-patient relationship.

Riassunto

La perdita intraddominale di un drenaggio nel periodo postoperatorio è una complicanza poco frequente, di solito evitabile, e molto probabilmente sottostimata a causa di rare segnalazioni in letteratura per timori medico-legali. In passato per la gestione di tale complicanza iatrogena era necessario procedere ad una nuova laparotomia o all'esplorazione della ferita. Ci sono poche segnalazioni in letteratura contemporanea di approcci risolutivi con tecniche mini-invasive.
Gli autori segnalano due casi di drenaggi persi in addome nell'immediato periodo post-operatorio dopo colecistectomia laparoscopica. Entrambi i casi sono stati trattati con successo con la tempestiva rimozione per via laparoscopica.
Si analizzano incidenza, eziologia, prevenzione, diagnosi e trattamento di questa rara complicanza. Si sottolinea l'importanza della laparoscopia non solo per i risultati estetici ma anche per il precoce recupero funzionale del paziente, condizioni che contribuiscono a ridurre l'attrito nel rapporto medico-paziente recentemente peggiorato.

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