One-stage laparoscopic bilateral adrenalectomy, cholecystectomy and choledochotomy by a transperitoneal anterior approach

Case report of a combined management for a challenging condition.

Ann. Ital. Chir., 2020 91, 3: 314-320
pii: S0003469X20032595

Diletta Corallino*, Francesca Meoli*, M. Livia Palmieri*, Giulia Puliani**, Andrea Isidori**, Alessandro M. Paganini

"Sapienza" University of Rome, Italy
**Department of General Surgery and Surgical Specialties "Paride Stefanini"*
***Department of Experimental Medicine*

One-stage laparoscopic bilateral adrenalectomy, cholecystectomy and choledochotomy by a transperitoneal anterior approach. Case report of a combined management for a challenging condition.

Laparoscopic adrenalectomy (LA) is the treatment of choice for management of adrenal tumors. Several approaches are proposed, including the transperitoneal one with patient in lateral or supine position, and the retroperitoneal one, with patient in lateral or prone position. The best approach, however, has yet to be defined.
In patients with gallstones and common bile duct (CBD) stones, available options are one-stage [including laparoscopic cholecystectomy (LC) with CBD exploration (LC-LCBDE) and LC with endoscopic rendez-vous (LC-ERV)], or two-stage management [LC and pre or postoperative Endoscopic-Retrograde-Cholangio-Pancreatography (ERCP) with endoscopic sphincterotomy (ES)]. Both are safe and effective, with lower hospital stay after one-stage option. The decision for one or the other depends on local resources and patient conditions.
We report the case of a hypertensive 53-years-old man with Cushing's disease from pituitary ACTH-secreting adenoma, after three failed trans-sphenoidal pituitary gland surgical resection procedures, and recurrent biliary symptoms from gallstones and CBD stones. The patient underwent laparoscopic transperitoneal bilateral adrenalectomy in supine position (anterior approach on the right, submesocolic approach on the left) together with LC, intraoperative cholangiography, choledochotomy, CBD exploration, T-tube drainage.
In this challenging case, laparoscopic transperitoneal bilateral adrenalectomy with patient in supine position together with one-stage laparoscopic management of gallstones and CBD stones, offered the patient the opportunity to solve both adrenal and biliary problems in the same session, reducing hospital stay and costs. In experienced hands, the transperitoneal combination of different surgical approaches during the same anesthesia with patient in supine position may provide safe and effective patient management.

KEY WORDS: Bilateral adrenalectomy, Laparoscopic adrenalectomy (LA), Choledochotomy, Common bile duct (CBD) stones, Laparoscopic cholecystectomy (LC) Laparoscopic common bile duct exploration (LCBDE), Submesocolic approach, Transperitoneal anterior approach

Introduction

In 1992, Gagner described the first transperitoneal laparoscopic adrenalectomy (LA) with patient in lateral decubitus position [1]. Since then, other approaches for LA have been proposed, including the transperitoneal anterior one with patient in supine position and the retroperitoneal approaches with patient in lateral decubitus or in prone position, each of these with specific advantages and disadvantages for both patients and surgeons [2-7]. Moreover, in case of transperitoneal anterior left LA, two surgical approaches are described in the literature, one requiring splenic flexure mobilization and another one opening the root of the transverse mesocolon lateral to the inferior mesenteric vein and passing behind the pancreatic body, namely the submesocolic route [8-12].

Pervenuto in Redazione Febbraio 2020. Accettato per la pubblicazione Marzo 2020.
Correspondence to: Diletta Corallino, Department of General Surgery and Surgical Specialties "Paride Stefanini", Sapienza, University of Rome, Viale del Policlinico 155, 00161, Rome, Italy (e-mail: dilettadile89@gmail.com)

Notwithstanding the minimally invasive approach is now considered to be the gold standard for adrenalectomy as compared to open surgery for both benign and selected malignant adrenal lesions [13,14], the choice of which should be the best approach is still debated [15,16].
Another debated issue is the treatment of choice in elective patients with gallstones and common bile duct (CBD) stones [17-20]. Two-stage management of gallstones and CBD stones by endo-laparoscopic approach, including laparoscopic cholecystectomy (LC) and pre or postoperative Endoscopic-Retrograde-Cholangio-Pancreatography (ERCP) with endoscopic sphincterotomy (ES), is a popular strategy [17,18]. Another option, introduced more than 20 years ago, is one-stage LC and laparoscopic CBD exploration (LCBDE) by either a trans-cystic or a direct choledochotomy approach [17,18]. Still another option, which has been introduced most recently, is one-stage laparo-endoscopic rendez-vous (LC-ERV) approach, in which ERCP/ES is performed during LC [19,20].
We report the case of a patient with Cushing's disease, gallstones and a residual CBD stone after preoperative ERCP and ES, who was surgically managed during the same anesthesia by a combination of transperitoneal bilateral LA and one-stage LC-LCBDE.

Case Report

A hypertensive 53-years-old man (body mass index 23 Kg/m^2) with recurrent biliary colic was referred from the Endocrinology Unit of our Hospital with the indication for bilateral adrenalectomy for management of complicated Cushing's disease, whose pituitary lesion was diagnosed by accurate magnetic resonance imaging for the specific evaluation of pituitary ACTH-secreting adenomas as reported in the literature [21]. The patient had previously undergone three failed attempts of transsphenoidal pituitary adenomectomy. Despite postoperative therapy with ketoconazole, the patient had difficult to treat hypokalemia, metabolic complication, hypertension and myopathy, and developed severe infection, complicated with sepsis and acute kidney failure. Preoperative abdominal ultrasound showed bilateral adrenal gland hyperplasia, contracted gallbladder with thickened walls (4 mm) and a 10 mm gallstone. The CBD was dilated (18 mm) and harbored a 9 mm stone in the prepancreatic segment. The patient underwent preoperative ERCP showing the presence of multiple ductal stones, with ES and clearance of the ductal stones.
The endoscopic procedure was uneventful. The patient was then considered a suitable candidate for laparoscopic bilateral adrenalectomy in supine position, with transperitoneal anterior adrenalectomy on the right and transperitoneal submesocolic adrenalectomy on the left, concurrent with LC during the same hospital admission.

Surgical Technique

The patient was positioned supine on the operative table with open legs. Under general anesthesia, an oro-gastric tube, urinary catheter, intra-arterial radial artery catheter for blood pressure measurement and a central venous catheter for liquid infusion were positioned.
Pneumoperitoneum was created at 12 mmHg pressure, with a Veress needle at the umbilicus, and the first 12 mm trocar was placed at the same site. A 30° forward oblique optic was used. Five more trocars were positioned under direct vision. One 5 mm trocar was inserted below the xiphoid process. On the right, two trocars were placed, a 12 mm one at the junction between the right midclavicular line and the transverse umbilical line and a 12 mm one along the right midaxillary line. On the left, two 12 mm trocars were placed, one at the junction of the left midclavicular line with the transverse umbilical line and the other along the left anterior axillary line.
Transperitoneal left submesocolic adrenalectomy was the first step of the procedure. The operative table was turned in slight anti-Trendelemburg position with the patient's right side down. The surgeon stood in between the patient's legs. The transverse mesocolon was lifted by the assistant with atraumatic forceps introduced from the subxyphoid trocar, to expose the first jejunal loop. This was displaced by the surgeon to the patient's right side and the arch of the inferior mesenteric vein was identified. The posterior parietal peritoneum just below the lower border of the pancreas was opened, immediately lateral to the inferior mesenteric vein, followed by opening of Toldt's fascia. Next, Gerota's fascia was divided and the upper margin of the left renal vein was identified by blunt dissection. The left renal vein was followed medially until the left inferior adrenal vein was identified, prepared by blunt dissection and divided between clips (Weck® Hem-o-lok®, Teleflex, North Carolina, USA). After its mobilization with a bipolar diathermy device (LigaSure™ tissue fusion, Covidien, Mansfield, Massachusetts, USA), as previously reported [22-26], the gland was removed with a specimen retrieval bag (Inzii® Retrieval Systems, Applied Medical, Rancho Santa Margarita, California, USA). A hemostatic facilitator (Floseal, Baxter Healtcare Corporation, Deerfield, Illinois, USA) and a drain were left in the residual left adrenal cavity [22-26].
Transperitoneal anterior right adrenalectomy was the second step of the procedure. The operative table remained in anti-Trendelemburg position, but it was turned with the patient's left side down. The surgeon moved to the patient's right side. The right liver was lifted by the assistant with a Nathanson retractor (Cook Medical, Bloomington, Indiana, USA) introduced from the subxyphoid trocar, exposing Morrison's pouch. The posterior parietal peritoneum was divided longitudinally with a bipolar diathermy device (LigaSure™ tissue fusion,

Covidien, Mansfield, Massachusetts, USA) along the right margin of the inferior vena cava above the duodenum, and the main adrenal vein was identified by blunt dissection and divided between clips (Weck® Hem-o-lok®, Teleflex, North Carolina, USA). After its complete mobilization with a bipolar diathermy device (LigaSure™ tissue fusion, Covidien, Mansfield, Massachusetts, USA) [22-26], the gland was removed inside a specimen retrieval bag (Inzii® Retrieval Systems, Applied Medical, Rancho Santa Margarita, California, USA). A hemostatic facilitator (Floseal, Baxter Healtcare Corporation, Deerfield, Illinois, USA) was used to fill the residual right adrenal cavity [22-26].

The third step of the procedure was LC. The surgeon moved to the left side of the patient. After obtaining the "critical view of safety" [27], the cystic artery and cystic duct were closed with Titanium clips (Covidien, Mansfield, Massachusetts, USA). Following our usual policy, routine intraoperative cholangiography (IOC) was performed with an Olsen cholangiogram clamp (Karl Storz GmbH & Co. KG, Tuttlingen, Germany) with 4 Fr. ureteral catheter and C-arm fluoroscope (General Electric Healthcare, Chicago, Illinois, USA), which showed the presence of a residual CBD stone. After failure of a transcystic approach, due to a narrow cystic duct with continent Heister valves, a transverse choledochotomy was performed, as previously reported [28-32]. A flexible choledochoscope (Karl Storz GmbH & Co. KG, Tuttlingen, Germany) was inserted through the choledochotomy to directly explore the CBD down to the papilla. A four wire, flat wire stone extractor catheter (W. Cook Europe APS, Denmark) was advanced through the working channel of the choledochoscope and the basket was deployed after passing its tip beyond the stone. The catheter was then pulled backwards until the stone was negotiated inside the wires of the basket and it was removed from the CBD. A T-tube biliary drainage (Silcolatex® T-tube, Willy Rüsch Ag, 71394 Kernen, Germany) was completely introduced into the peritoneal cavity and the tailored transverse branches were introduced through the choledochotomy [28-32]. After suture of the choledochotomy, as previously reported [28-32], a transcystic control IOC, as described above, showed absence of residual ductal stones and no bile leak. The procedure was completed with retrograde cholecystectomy. The gallbladder and the ductal stone were removed inside a specimen retrieval bag (Inzii® Retrieval Systems, Applied Medical, Rancho Santa Margarita, California, USA), the long branch of the T-tube was extracted through the right midclavicular line incision and a drain was placed in the sub-hepatic space through the midaxillary line incision. The operating time was 355 minutes. The postoperative course was uneventful, and the patient was discharged on postoperative day 4 with the T-tube biliary drainage closed under a medication. Definitive histology showed diffuse adrenal hyperplasia for both adrenal glands and chronic atrophic cholecystitis. Patient started glucocorticoid therapy immediately after surgery, in order to replace the adrenal function, as reported in the literature [33], with good compliance and positive metabolic results in terms of carbohydrate and lipid metabolism.

Four weeks after surgery, the external T-tube biliary drainage was removed after a negative biliary drainage cholangiography confirming the absence of residual stones or bile leak.

The internist-endocrinological follow-up, now at 55 months duration, showed a clear improvement of creatinine and glomerular filtration rate, a normalization in potassium levels, a significant reduction of infectious diseases associated to an impressing better quality of life than before surgery.

Discussion

LA has several advantages over open adrenalectomy, including minimal postoperative pain, diet tolerance on the first postoperative day and shorter hospital stay [34,35]. A laparoscopic transperitoneal approach with patient in lateral decubitus position is mostly performed worldwide, followed by the retroperitoneal and the anterior approaches [36]. The main advantages of the transperitoneal lateral approach are a wide exposure of the operative field and a short learning curve [2,37]. Other authors advocate the retroperitoneal approach for minimally invasive adrenalectomy, with advantages that include more rapid resumption of bowel motility due to the absence of bowel manipulation, less postoperative pain and an easier approach in obese patients and in patients with adhesions from previous intra-peritoneal surgery [2,38].

In this particular case, the authors believe that the best laparoscopic approach was the anterior one. In fact, this approach has allowed us to perform bilateral adrenalectomy and LC with CBD exploration for a residual ductal stone, without having to reposition the patient, as would have been required in case of a lateral or retroperitoneal approach. The obvious advantage is a reduction in the operative time. Walz *et al.* consider large adrenal masses as a contraindication for the retroperitoneal approach [38]. In our opinion the anterior approach has other advantages, which may not have been evident in this case, such as early ligation of the adrenal vein prior to gland manipulation, particularly useful in case of pheochromocytoma or adrenal cancer, and the possibility for a rapid conversion to open surgery, if required in case of massive bleeding [25,39]. Furthermore, in case of left adrenalectomy, the submesocolic approach, as opposed to the transperitoneal anterior or lateral approach, does not require mobilization of the left colonic flexure or of the spleno-pancreatic complex, further reducing the operating time and the risk of iatrogenic lesions [23-26].

Concerning the gold standard management of elective

patients with gallstones and CBD stones, several studies report ERCP/ES to be the procedure of choice for the management of CBD stones, and that LCBDE has not yet gained widespread acceptance amongst surgeons [29,40,41]. However, according to some authors one-stage LC-LCBDE is better than the two stage endo-laparoscopic approach in terms of lower morbidity rate, higher ductal clearance rate, lower recurrent stones rate and shorter hospital stay [42-44]. Both the trans-cystic and direct choledochotomy approach have been proposed in order to clear the CBD from stones [29]. These procedures are considered equally safe and effective although having different indications [28,29]. Few small stones located in the CBD are best removed under vision with a choledochoscope introduced through the cystic duct. When multiple stones are present in the CBD and in the common hepatic duct, or after failed transcystic CBD exploration, the procedure of choice is a choledochotomy with direct ductal exploration, provided the CBD is dilated more than 8 mm in diameter [28,29]. IOC is able to show the details concerning the anatomy of the extrahepatic biliary tree, as well as the number, size and location of the ductal stones, that are necessary to decide which is the best approach to perform (trans-cystic or choledochotomy) in the individual case. Moreover, control IOC allows to check complete CBD clearance and absence of leaks upon completion of the procedure after suture of the choledochotomy. During difficult cholecystectomy cases, as it is the case in patients with severe acute cholecystitis or sclero-atrophic cholecystitis, IOC allows to identify the biliary tree with a protective effect to prevent a bile duct injury [30,46,47]. The introduction of Indocyanine Green (ICG) Fluorocholangiography has also proven to be effective to facilitate recognition of the extrahepatic biliary tree, as recently reported [48,49] although it was not used in this particular case because not yet available at the time.

Treatment of ductal stones by pre or postoperative ERCP/ES requires technical expertise and prolongs the hospital stay with increased costs [29,50]. Moreover, the division of the papilla, which acts as a physiological barrier between the CBD and the bowel, promotes bactibilia which is a risk factor for the subsequent recurrence of ductal stones [28]. One-stage LC-ERV approach has proven to be associated with good results in terms of higher ductal clearance rate, lower postoperative pancreatitis rate and lower costs, as compared to two-stage preoperative ERCP/ES and LC, and it does not require laparoscopic suturing skills or biliary drainage, even if an ES is still necessary [29,51].

However, it requires an experienced endoscopist to be readily available when the presence of ductal stones is confirmed by IOC, and this may be a severely limiting factor due to the busy schedule of endoscopists or in hospitals where an experienced biliary endoscopist is not available. In the end, in the elective setting the treatment of choice for patients with gallstones and CBD stones is essentially dependent on local resources and expertise.

In this particular case of a frail patient with Cushing's disease at risk of septic complications, a two-stage approach with preoperative ERCP and ES was considered to be safer and was uneventful. However, the presence of a residual ductal stone demonstrated by routine IOC prompted the need for a same session LCBDE during LC, which was successful and uneventful.

Conclusion

In this particular case the possibility to combine several laparoscopic transperitoneal approaches with patient supine allowed to offer the patient complete resolution of bilateral adrenal and of both biliary problems during the same hospitalization. Although a clear superiority of one approach over another has yet to be proven, with the surgical strategy being more often chosen based on surgeon's preferences and local resources, the tailored combination of multiple surgical procedures in this case led to effective management, which was most satisfactory for the patient.

Acknowledgments

The authors are grateful to Dr E. Sbardella for her contribution in data collection and critical review of the manuscript.

Riassunto

La surrenalectomia mini-invasiva è il trattamento di scelta nei tumori surrenalici. Sono stati proposti diversi approcci, transperitoneale laterale o anteriore oppure retroperitoneale laterale o posteriore. Quale di questi sia migliore non è ancora stabilito.

Nel trattamento elettivo della litiasi colecisto-coledocica, se da un lato alcune evidenze favoriscono la colecistectomia laparoscopica (CL) con esplorazione laparoscopica della via biliare principale (VBP) in tempo unico, il trattamento endo-laparoscopico in due tempi, CL e colangiopancreatografia retrograda endoscopica (CPRE) con sfinterotomia endoscopica (SE) pre o post-operatoria, è la strategia maggiormente impiegata. Recentemente, è stato proposto il rendez-vous laparo-endoscopico in tempo unico.

Riportiamo il caso di un uomo di 53 anni (indice di massa corporea 23 kg/m^2), con ipertensione arteriosa e litiasi colecisto-coledocica, inviatoci per malattia di Cushing da adenoma ipofisario ACTH-secernente, dopo tre procedure fallite di resezione ipofisaria transfenoidale. Sottoposto a bonifica endoscopica preoperatoria con CPRE/SE, il paziente è stato sottoposto a surrenalectomia bilaterale laparoscopica (anteriore per il surrene

destro, submesocolica a sinistra) e CL, con colangiografia intraoperatoria che mostrava calcolosi residua del coledoco, trattata mediante coledocotomia laparoscopica e tubo di Kehr.
L'approccio transperitoneale anteriore con paziente in decubito supino ha consentito di risolvere entrambe le patologie surrenaliche e biliari nello stesso tempo operatorio. Anche se la strategia chirurgica dipende dalle preferenze del chirurgo e dalle risorse locali, causa la mancanza di una chiara superiorità di un approccio rispetto a un altro, la via transperitoneale in decubito supino ha permesso di combinare diverse procedure, con benefici per il paziente che altre procedure non consentono.

References

1. Gagner M, Lacroix A, Bolté E: *Laparoscopic adrenalectomy in Cushing's syndrome and pheochromocytoma.* N Engl J Med, 1992; 327(14):1033.

2. Mohammadi-Fallah MR, Mehdizadeh A, Badalzadeh A, Izadseresht B, Dadkhah N, Barbod A, Babaie M, Hamedanchi S: C*omparison of transperitoneal versus retroperitoneal laparoscopic adrenalectomy in a prospective randomized study*. J Laparoendosc Adv Surg Tech A, 2013; 23(4):362-66. doi: 10.1089/lap.2012.0301.

3. Coste T, Caiazzo R, Torres F, Vantyghem MC, Carnaille B, Do Cao C, Douillard C, Pattou F: *Laparoscopic adrenalectomy by transabdominal lateral approach: 20 years of experience*. Surg Endosc, 2017; 31(7):2743-2751. doi: 10.1007/s00464-016-4830-0.

4. Constantinides VA, Christakis I, Touska P, Palazzo FF: *Systematic review and meta-analysis of retroperitoneoscopic versus laparoscopic adrenalectomy.* Br J Surg, 2012; 99(12):1639-648. doi: 10.1002/bjs.8921.

5. Alesina PF, Hommeltenberg S, Meier B, Petersenn S, Lahner H, Schmid KW, Mann K, Walz MK: *Posterior retroperitoneoscopic adrenalectomy for clinical and subclinical Cushing's syndrome.* World J Surg, 2010; 34(6):1391-397. doi: 10.1007/s00268-010-0453-0.

6. Chung HS, Kim MS, Yu HS, Hwang EC, Kim SO, Oh KJ, Jung SI, Kang TW, Park K, Kwon DD: *Laparoscopic adrenalectomy using the lateral retroperitoneal approach: Is it a safe and feasible treatment option for pheochromocytomas larger than 6 cm?* Int J Urol, 2018; 25(5):414-19. doi: 10.1111/iju.13524.

7. Lezoche E, Guerrieri M, Crosta F, Paganini A, D'Ambrosio G, Lezoche G, Campagnacci R: *Perioperative results of 214 laparoscopic adrenalectomies by anterior transperitoneal approach*. Surg Endosc, 2008; 22(2):522-26.

8. Linos DA, Stylopoulos N, Boukis M, Souvatzoglou A, Raptis S, Papadimitriou J: *Anterior, posterior, or laparoscopic approach for the management of adrenal diseases*? Am J Surg, 1997; 173(2):120-25.

9. Ortenzi M, Balla A, Ghiselli R, Vergari R, Silecchia G, Guerrieri E, Maria Paganini A, Guerrieri M: *Minimally invasive approach to the adrenal gland in obese patients with Cushing's syndrome. Minim Invasive* Ther Allied Technol. 2019 J; 19:1-7. doi: 10.1080/13645706.2018.1536669.

10. Balla A, Quaresima S, Ortenzi M, Palmieri L, Meoli F, Corallino D, Guerrieri M, Ursi P, Paganini AM: *Results after laparoscopic left anterior transperitoneal submesocolic adrenalectomy for the treatment of pheochromocytoma*. Ann Ital Chir, 2019; 90:220-24.

11. Balla A, Palmieri L, Meoli F, Corallino D, Ortenzi M, Ursi P, Guerrieri M, Quaresima S, Paganini AM*: Are adrenal lesions of 6 cm or more in diameter a contraindication to laparoscopic adrenalectomy? A case control study.* World J Surg, 2019. doi: 10.1007/s00268-019-05287-2.

12. Sardi A, McKinnon WM: *Laparoscopic adrenalectomy in patients with primary aldosteronism*. Surg Laparosc Endosc, 1994; 4(2):86-91.

13. Dalvi AN, Thapar PM, Thapar VB, Rege SA, Deshpande AA: *Laparoscopic adrenalectomy for large tumours: Single team experience*. J Minim Access Surg, 2012; 8(4):125-28. doi: 10.4103/0972-9941.103110.

14. Arora E, Bhandarwar A, Wagh A, Gandhi S, Patel C, Gupta S, Talwar G, Agarwal J, Rathore J, Chatnalkar S: *Role of indo-cyanine green (ICG) fluorescence in laparoscopic adrenalectomy: A retrospective review of 55 Cases*. Surg Endosc,2018;32(11):4649-657. doi: 10.1007/s00464-018-6309-7.

15. Balla A, Quaresima S, Paganini AM: *Laparoscopic adrenalectomy: Is the choice of the best surgical approach a resolved issue?* Ann Laparosc Endosc Surg, 2018; 3:36. doi: 10.21037/ales.2018.04.01.

16. Stefanidis D, Goldfarb M, Kercher KW, Hope WW, Richardson W, Fanelli RD: *Society of Gastrointestinal and Endoscopic Surgeons. SAGES guidelines for minimally invasive treatment of adrenal pathology*. Surg Endosc, 2013; 27(11):3960-980. doi: 10.1007/s00464-013-3169-z.

17. Singh AN, Kilambi R: *Single-stage laparoscopic common bile duct exploration and cholecystectomy versus two-stage endoscopic stone extraction followed by laparoscopic cholecystectomy for patients with gallbladder stones with common bile duct stones: systematic review and meta-analysis of randomized trials with trial sequential analysis*. Surg Endosc, 2018; 32(9):3763-3776. doi: 10.1007/s00464-018-6170-8.

18. Ding G, Cai W, Qin M: *Single-stage vs. two-stage management for concomitant gallstones and common bile duct stones: a prospective randomized trial with long-term follow-up*. J Gastrointest Surg, 2014; 18(5):947-51. doi: 10.1007/s11605-014-2467-7.

19. Tzovaras G, Baloyiannis I, Zachari E, Symeonidis D, Zacharoulis D, Kapsoritakis A, Paroutoglou G, Potamianos S: *Laparoendoscopic rendezvous versus preoperative ERCP and laparoscopic cholecystectomy for the management of cholecysto-choledocholithiasis: interim analysis of a controlled randomized trial.* Ann Surg, 2012; 255(3):435-9. doi: 10.1097/SLA.0b013e3182456ec0.

20. La Barba G, Gardini A, Cavargini E, Casadei A, Morgagni P, Bazzocchi F, D'Acapito F, Cavaliere D, Curti R, Tringali D, Cucchetti A, Ercolani G: *Laparoendoscopic rendezvous in the treatment of cholecysto-choledocholitiasis: A single series of 200 patients*. Surg Endosc. 2018; 32(9):3868-3873. doi: 10.1007/s00464-018-6125-0.

21. Vitale G, Tortora F, Baldelli R, Cocchiara F, Paragliola RM, Sbardella E, Simeoli C, Caranci F, Pivonello R, Colao A: *A.B.C. Group. Pituitary magnetic resonance imaging in Cushing's disease.* Endocrine, 2017; 55(3):691-96. doi: 10.1007/s12020-016-1038-y.

22. Balla A, Ortenzi M, Palmieri L, Corallino D, Meoli F, Ursi P, Puliani G, Sbardella E, Isidori AM, Guerrieri M, Quaresima S, Paganini AM: *Laparoscopic bilateral anterior transperitoneal adrenalectomy: 24 years experience.* Surg Endosc, 2019; 33(11):3718-3724. doi: 10.1007/s00464-019-06665-6.

23. Balla A, Quaresima S, Palmieri L, Ortenzi M, Sbardella E, Puliani G, Isidori AM, Guerrieri M, Paganini AM: *Is laparoscopic left adrenalectomy with the anterior submesocolic approach for Conn's or Cushing's syndrome equally safe and effective as the lateral and anterior ones?* Surg Endosc, 2019; 33(9):3026-33. doi: 10.1007/s00464-018-6601-6.

24. Paganini AM, Guerrieri M, Balla A, Quaresima S, Isidori AM, Iafrate F, D'Ambrosio G, Lezoche G, Lezoche E: *Management of adrenal incidentaloma by laparoscopic transperitoneal anterior and submesocolic approach*. Langenbecks Arch Sur, 2016; 401(1):71-9. doi: 10.1007/s00423-015-1367-y.

25. Paganini AM, Balla A, Guerrieri M, Lezoche G, Campagnacci R, D'Ambrosio G, Quaresima S, Antonica MV, Lezoche E: *Laparoscopic transperitoneal anterior adrenalectomy in pheochromocytoma: experience in 62 patients*. Surg Endosc. 2014; 28(9):2683-9. doi: 10.1007/s00464-014-3528-4.

26. Scoglio D, Balla A, Paci M, Guerrieri M, Lezoche G, D'Ambrosio G, Fabiani B, Ursi P, Paganini AM: *Laparoscopic transperitoneal anterior adrenalectomy*. Ann Ital Chir, 2013; 84(4):411-16.

27. Strasberg SM, Hertl M, Soper NJ: *An analysis of the problem of biliary injury during laparoscopic cholecystectomy.* J Am Coll Surg, 1995; 180(1):101-25.

28. Paganini AM, Palmieri L, Balla A: *How I do it: Laparoscopic treatment of common bile duct stones.* Ann Laparosc Endosc Surg, 2019; 4:62. doi: 10.21037/ales.2019.06.03.

29. Quaresima S, Balla A, Guerrieri M, Campagnacci R, Lezoche E, Paganini AM: *A 23 year experience with laparoscopic common bile duct exploratio*n. HPB (Oxford), 2017; 19(1):29-35. doi: 10.1016/j.hpb.2016.10.011.

30. Quaresima S, Balla A, Palmieri L, Seitaj A, Fingerhut A, Ursi P, Paganini AM: *Routine near infra-red indocyanine green fluorescent cholangiography versus intraoperative cholangiography during laparoscopic cholecystectomy: A case-matched comparison.* Surg Endosc, 2019. doi: 10.1007/s00464-019-06970-0.

31. Lezoche E, Paganini AM: *Single-stage laparoscopic treatment of gallstones and common bile duct stones in 120 unselected, consecutive patients.* Surg Endosc, 1995; 9(10):1070-75.

32. Lezoche E, Paganini AM, Guerrieri M: *A new T-tube applier in laparoscopic surgery*. Surg Endosc, 1996; 10(4):445-48.

33. Isidori AM, Arnaldi G, Boscaro M, Falorni A, Giordano C, Giordano R, Pivonello R, Pozza C, Sbardella E, Simeoli C, Scaroni C, Lenzi A: *Italian Society of Endocrinology. Towards the tailoring of glucocorticoid replacement in adrenal insufficiency: the Italian Society of Endocrinology Expert Opinion.* J Endocrinol Invest, 2019; doi: 10.1007/s40618-019-01146-y.

34. Bonjer HJ, Sorm V, Berends FJ, Kazemier G, Steyerberg EW, de Herder WW, Bruining HA: *Endoscopic retroperitoneal adrenalectomy: lessons learned from 111 consecutive cases.* Ann Surg, 2000; 232(6):796-803.

35. Gagner M, Pomp A, Heniford BT, Pharand D, Lacroix A: *Laparoscopic adrenalectomy: lessons learned from 100 consecutive procedures.* Ann Surg, 1997; 226(3):238-47.

36. Chen H, Sippel RS, O'Dorisio MS, Vinik AI, Lloyd RV, Pacak K: North American Neuroendocrine Tumor Society (NANETS). *The North American Neuroendocrine Tumor Society consensus guideline for the diagnosis and management of neuroendocrine tumors: Pheochromocytoma, paraganglioma, and medullary thyroid cancer*. Pancreas, 2010; 39(6):775-83. doi: 10.1097/MPA.0b013e3181ebb4f0.

37. Assalia A, Gagner M: *Laparoscopic adrenalectomy.* Br J Surg, 2004; 91(10):1259-74.

38. Walz MK, Alesina PF, Wenger FA, Deligiannis A, Szuczik E, Petersenn S, Ommer A, Groeben H, Peitgen K, Janssen OE, Philipp T, Neumann HP, Schmid KW, Mann K: *Posterior retroperitoneoscopic adrenalectomy. Results of 560 procedures in 520 patients*. Surgery. 2006; 140(6):943-8; discussion 948-50.

39. Matsuda T, Murota T, Kawakita M: *Transperitoneal anterior laparoscopic adrenalectomy: The easiest technique*. Biomed Pharmacother, 2000; 54 (Suppl 1):157s-160s.

40. Baucom RB, Feurer ID, Shelton JS, Kummerow K, Holzman MD, Poulose BK: *Surgeons, ERCP, and laparoscopic common bile duct exploration: do we need a standard approach for common bile duct stones?* Surg Endosc, 2016; 30(2):414-23. doi: 10.1007/s00464-015-4273-z.

41. Ludwig K, Lorenz D, Koeckerling F:*Surgical strategies in the laparoscopic therapy of cholecystolithiasis and common duct sto*nes. ANZ J Surg, 2002; 72(8):547-52.

42. Lyass S, Phillips EH: *Laparoscopic transcystic duct common bile duct explor*ation. Surg Endosc; 2006; 20 Suppl 2:S441-45.

43. Liu JG, Wang YJ, Shu GM, Lou C, Zhang J, Du Z: *Laparoscopic versus endoscopic management of choledocholithiasis in patients undergoing laparoscopic cholecystectomy: a me,ta-analysis.* J Laparoendosc Adv Surg Tech A, 2014; 24(5):287-94. doi: 10.1089/lap.2013.0546.

44. Zhu HY, Xu M, Shen HJ, Yang C, Li F, Li KW, Shi WJ, Ji F: *A meta-analysis of single-stage versus two-stage management for concomitant gallstones and common bile duct* stones. Clin Res Hepatol Gastroenterol. 2015; 39(5):584-93. doi: 10.1016/j.clinre. 2015.02.002.

45. Quaresima S, Balla A, Guerrieri M, Lezoche G, Campagnacci R, D'Ambrosio G, Lezoche E, Paganini AM: *Results of medium seventeen years' follow-up after laparoscopic choledochotomy for ductal stones.* Gastroenterol Res Pract, 2016; 2016:9506406. doi: 10.1155/2016/9506406.

46. Törnqvist B, Strömberg C, Akre O, Enochsson L, Nilsson M: *Selective intraoperative cholangiography and risk of bile duct injury during cholecystectom*y. Br J Surg, 2015; 102(8):952-58. doi: 10.1002/bjs.9832.

47. Balla A, Quaresima S, Corona M, Lucatelli P, Fiocca F, Rossi M, Bezzi M, Catalano C, Salvatori FM, Fingerhut A, Paganini AM: *ATOM Classification of Bile Duct Injuries During Laparoscopic Cholecystectomy: Analysis of a Single Institution Experience.* J Laparoendosc Adv Surg Tech A, 2019; 29(2):206-212. doi: 10.1089/lap.2018.0413.

48. Quaresima S, Balla A, Palmieri L, Seitaj A, Fingerhut A, Ursi P, Paganini AM: *Routine near infra-red indocyanine green fluorescent cholangiography versus intraoperative cholangiography during laparoscopic cholecystectomy: A case-matched comparison*. Surg Endosc, 2019; 15. doi: 10.1007/s00464-019-06970-0.

49. Agnus V, Pesce A, Boni L, Van Den Bos J, Morales-Conde S, Paganini AM, Quaresima S, Balla A, La Greca G, Plaudis H, Moretto G, Castagnola M, Santi C, Casali L, Tartamella L, Saadi

A, Picchetto A, Arezzo A, Marescaux J, Diana M: *Fluorescence-based cholangiography: Preliminary results from the IHU-IRCAD-EAES EURO-FIGS registry*. Surg Endosc, 2019; 7. doi: 10.1007/s00464-019-07157-3.

50. Mattila A, Mrena J, Kellokumpu I: *Cost-analysis and effectiveness of one-stage laparoscopic versus two-stage endolaparoscopic management of cholecystocholedocholithiasis: A retrospective cohort study.* BMC Surg, 2017, 6;17(1):79. doi: 10.1186/s12893-017-0274-2.

51. Arezzo A, Vettoretto N, Famiglietti F, Moja L, Morino M: *Laparoendoscopic rendezvous reduces perioperative morbidity and risk of pancreatitis.* Surg Endosc, 2013; 27(4):1055-60. doi: 10.1007/s00464-012-2562-3.