

**1. Surgery. 2022 Jan 10:S0039-6060(21)01189-2. doi: 10.1016/j.surg.2021.12.003.**

**Online ahead of print.**

*Robot-assisted versus conventional laparoscopic adrenalectomy: Results from the EUROCRINE Surgical Registry.*

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**BACKGROUND:** Adrenalectomy is routinely performed via the minimally invasive approach. Safety of adrenalectomy using the robot-assisted technique has been widely demonstrated by several series, but the literature is scarce regarding the comparison of conventional laparoscopic versus robot-assisted approach. We decided to carry out a multicenter study to compare clinical and surgical outcomes between laparoscopic and robotic adrenalectomy.

**METHODS:** This is a retrospective case-control study, including data from centers affiliated to the Surgical Registry EUROCRINE. Patients undergoing laparoscopic

surgery for adrenal tumors and registered between 2015 and 2018 were included. Robot-assisted versus laparoscopic adrenalectomy was compared. All comparisons were carried out in terms of complication rate, conversion rate and duration of stay.

**RESULTS:** A total of 1,005 patients from 46 clinics underwent robotic or conventional laparoscopic adrenalectomy. Median age was 55 (interquartile range: 45-65) years. Robotic adrenalectomy was performed in 189 (18.8%) patients. According to Clavien-Dindo classification, complication rate was lower in the robotic surgery group (1.6% vs 16.5%,  $P < .001$ ). Laparoscopic surgery and active hormonal status were significantly correlated with complications, both in univariate and multivariate analysis. There was no significant difference between laparoscopic and robotic surgery groups, in terms of conversion rate (2.1% vs 0.5%, respectively,  $P = .147$ ). Duration of stay was shorter in the robotic adrenalectomy group (82.1% vs 28.8%,  $P < .001$ ).

**CONCLUSION:** Analysis of the EUROCRINE database supports that robotic adrenalectomy resulted in a lower complication rate and shorter duration of stay, compared with laparoscopic adrenalectomy. Granular data to support this is warranted.

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## **2. Surg Endosc. 2022 Jan 13. doi: 10.1007/s00464-021-09005-9. Online ahead of print.**

*Predicting surgical outcome in posterior retroperitoneoscopic adrenalectomy with the aid of a preoperative nomogram.*

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**BACKGROUND:** Posterior retroperitoneoscopic adrenalectomy (PRA) has several advantages over transperitoneal laparoscopic adrenalectomy (TLA) regarding operative time, blood loss, postoperative pain, and recovery. However, it can be a technically challenging procedure. To improve patient selection for PRA, we developed a preoperative nomogram to predict operative time.

**METHODS:** All consecutive patients with tumors of  $\leq 7$  cm and a body mass index (BMI) of  $< 35$  kg/m<sup>2</sup> undergoing unilateral PRA between February 2011 and March 2020 were included in the study. The primary outcome was operative time as surrogate endpoint for surgical complexity. Using ten patient variables, an optimal prediction model was created, with a best subsets regression analysis to find the best one-variable up to the best seven-variable model.

**RESULTS:** In total 215 patients were included, with a mean age of 52 years and mean tumor size of 2.4 cm. After best subsets regression analysis, a four-variable nomogram was selected and calibrated. This model included sex, pheochromocytoma, BMI, and perinephric fat, which were all individually significant predictors. This model showed an ideal balance between predictive power and applicability, with an R2 of 38.6.

**CONCLUSIONS:** A four-variable nomogram was developed to predict operative time in PRA, which can aid the surgeon to preoperatively identify suitable patients for PRA. If the nomogram predicts longer operative time and therefore a more complex operation, TLA should be considered as an alternative approach since it provides a larger working space. Also, the nomogram can be used for training purposes to select patients with favorable characteristics when learning this surgical approach.

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**3. J Int Med Res. 2022 Jan;50(1):3000605211072664. doi: 10.1177/03000605211072664.**

*A retroperitoneal bronchogenic cyst clinically mimicking an adrenal mass: three case reports and a literature review.*

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Bronchogenic cysts are a congenital primitive foregut-derived developmental malformation, generally occurring in the posterior mediastinum. Their development in the retroperitoneum is extremely rare. Imaging techniques, such as multidetector computed tomography (MDCT), are typically effective in the detection of these lesions. Here, we describe three cases of a retroperitoneal cyst presenting as a para-adrenal mass. Only one boy presented with abdominal pain, and the other two showed no clinical symptoms. Endocrinological evaluation of all three cases was performed, and no adrenal hormone secretion was detected. All three cases were misdiagnosed preoperatively. Each patient underwent surgery, and one symptomatic patient became asymptomatic after surgery. Pathologic examination confirmed all three masses as bronchogenic cysts. The three cases showed some similar MDCT imaging features, including a complete adrenal structure, a cystic or solid mass in the adrenal region, and no obvious enhancement. Therefore, bronchogenic cysts should be considered in the differential diagnosis of retroperitoneal masses, even though accurate preoperative diagnosis remains difficult. A contrast-enhanced MDCT scan may be useful for differentiating hyper-attenuated cysts from other soft tissue masses.

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PMID: 35023387 [Indexed for MEDLINE]

**4. Cancers (Basel). 2021 Dec 29;14(1):156. doi: 10.3390/cancers14010156.**

*Outcomes after Surgical Treatment of Metastatic Disease in the Adrenal Gland; Valuable for the Patient?*

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The adrenal glands are common dissemination sites for metastasis of various solid tumors. Surgical treatment is often recommended because targeted therapies and immunotherapy are frequently ineffective for adrenal metastasis. We report the experience with short-term and long-term surgical outcomes of patients undergoing surgery for adrenal metastasis in two hospitals. A retrospective, multicenter study was performed to analyze patient characteristics, tumor-related data, perioperative outcomes, and oncological outcomes. Postoperative complications that occurred within 30 days were scored according to the Clavien Dindo classification. Metastatic adrenalectomy was performed in 95 patients. We observed an increase from an average of 3 metastatic adrenalectomies per year between 2001-2005 to 10 between 2015-2019. The most frequent underlying malignancies were colorectal and lung cancer. In 55.8%, minimal invasive adrenalectomy was performed, including six conversions to open surgery. A total of 37.9% of patients had postoperative complications, of which ileus or gastroparesis, wound problems, pneumonia, and heart arrhythmias were the most occurring complications. Improved cancer care has led to an increased demand for metastatic adrenalectomy over the past years. Complication rates of 37.9% are significant and cannot be neglected. Therefore, multidisciplinary teams should weigh the decision to perform metastatic adrenalectomy for each patient individually, taking into account the drawbacks of the described morbidity versus the potential benefits.

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PMID: 35008320

Conflict of interest statement: The authors declare no conflict of interest.

**5. Cureus. 2021 Nov 27;13(11):e19938. doi: 10.7759/cureus.19938. eCollection 2021 Nov.**

*Incidental Adrenal Mass in a Patient With Surgically Treated Lung Adenocarcinoma.*

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Adrenal metastases are not uncommon in patients with widespread metastatic lung

cancer. Isolated metachronous adrenal metastases in cases of surgically treated lung cancer without long-term evidence of disease are rare and may pose a diagnostic and treatment dilemma. The current literature suggests that in such cases, adrenalectomy provides better median and overall survival rates. This case presents an incidentally discovered isolated adrenal mass in a patient with a past medical history of lung adenocarcinoma that was surgically removed three years before metastasis discovery. The patient successfully underwent adrenalectomy and was disease-free with no apparent complications at her three-month follow-up visit. The case highlights the importance of long-term radiographic surveillance after surgical resection of lung adenocarcinoma for the prompt diagnosis and timely treatment of metachronous metastases.

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PMCID: PMC8714050

PMID: 34984114

Conflict of interest statement: The authors have declared that no competing interests exist.

**6. In Vivo. 2022 Jan-Feb;36(1):49-56. doi: 10.21873/invivo.12675.**

*Thoracic Neuroblastoma: A Novel Surgical Model for the Study of Extra-adrenal Neuroblastoma.*

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**BACKGROUND/AIM:** Neuroblastoma is clinically and molecularly heterogeneous, with poor outcomes despite multimodal treatment strategies. The primary tumor site is an independent predictor of survival; adrenal tumors have the worst outcomes, while posterior mediastinum tumors carry a more favorable prognosis.

**MATERIALS AND METHODS:** To elucidate the role of the primary tumor microenvironment in mediating survival outcomes, we developed a mouse model for the study of extra-adrenal neuroblastoma by injecting luciferase-tagged cells into either the subpleural space of the posterior chest or the adrenal gland.

**RESULTS:** Solid tumors developed in the thoracic cavity at the same rate and efficiency as the adrenal as early as one week post-surgery. The survival rate following surgery was equivalent, though the physiological tolerance for large tumors was lower in the thoracic group.

**CONCLUSION:** This novel mouse model of survivable extra-adrenal neuroblastoma will enable future investigations of the distinct tumor microenvironments between the adrenal gland and posterior mediastinum.

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PMID: 34972699 [Indexed for MEDLINE]

**7. Anim Biotechnol. 2021 Dec 14:1-8. doi: 10.1080/10495398.2021.2007116. Online ahead of print.**

*Adrenal gland responses surgical castration and immunocastration by different compensatory manners to increase DHEA secretion.*

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Androgen from the testis and weak androgens from the adrenal cortex may interact with each other and affect their synthesis and secretion due to their similar functions. The purpose of this study was to investigate the compensatory effect of adrenal in rats after immunocastration and surgical castration, and the interaction between the hypothalamic-pituitary-testis (HPT) axis and the hypothalamic-pituitary-adrenal (HPA) axis. 24 male SD rats aged 8 weeks were randomly divided into three groups and accepted treatments: surgical castration group, immunocastration group and control group. In both surgical castration and immunocastration groups, the secretion of adrenocorticotrophic hormone (ACTH) and dehydroepiandrosterone (DHEA) hormones was significantly increased compared with the control group ( $p < 0.05$ ). In the HPT axis of the immunocastration group, the KISS1 expression was up-regulated, whereas GPR54, LH and LHR expression were down-regulated ( $p < 0.05$ ). The expression levels of CRH, POMC and MC2R genes were also significantly up-regulated ( $p < 0.05$ ). In addition, in the immunocastration group, the expression of adrenal LHR mRNA expression was decreased ( $p < 0.05$ ). The expression of HPT axis genes and adrenal LHR were up-regulated in the surgical castration group ( $p < 0.05$ ). These results show that in both immunocastration and surgical castration, adrenal androgen is increased, suggesting that the adrenal gland plays a compensatory role. Moreover, it also shows that different castration treatments have effects on adrenal steroid secretion through different mechanisms.

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PMID: 34904516

**8. Hypertension. 2022 Jan;79(1):187-195. doi: 10.1161/HYPERTENSIONAHA.121.18284.**

**Epub 2021 Nov 17.**

*Feasibility of Imaging-Guided Adrenalectomy in Young Patients With Primary Aldosteronism.*

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Many of the patients with primary aldosteronism (PA) are denied curative adrenalectomy because of limited availability or failure of adrenal vein sampling. It has been suggested that adrenal vein sampling can be omitted in young patients with a unilateral adrenal nodule, who show a florid biochemical PA phenotype. As this suggestion was based on a very low quality of evidence, we

tested the applicability and accuracy of imaging, performed by computed tomography and/or magnetic resonance, for identification of unilateral PA, as determined by biochemical and/or clinical cure after unilateral adrenalectomy. Among 1625 patients with PA submitted to adrenal vein sampling in a multicenter multiethnic international study, 473 were  $\leq 45$  years of age; 231 of them had exhaustive imaging and follow-up data. Fifty-three percentage had a unilateral adrenal nodule, 43% had no nodules, and 4% bilateral nodules. Fifty-six percentage (n=131) received adrenalectomy and 128 were unambiguously diagnosed as unilateral PA. A unilateral adrenal nodule on imaging and hypokalemia were the strongest predictors of unilateral PA at regression analysis. Accordingly, imaging allowed correct identification of the responsible adrenal in 95% of the adrenalectomized patients with a unilateral nodule. The rate raised to 100% in the patients with hypokalemia, who comprised 29% of the total, but fell to 88% in those without hypokalemia. Therefore, a unilateral nodule and hypokalemia could be used to identify unilateral PA in patients  $\leq 45$  years of age if adrenal vein sampling is not easily available. However, adrenal vein sampling remains indispensable in 71% of the young patients, who showed no nodules/bilateral nodules at imaging and/or no hypokalemia. Registration: URL: <https://www.clinicaltrials.gov>; Unique identifier: NCT01234220. DOI: 10.1161/HYPERTENSIONAHA.121.18284 PMID: 34878892 [Indexed for MEDLINE]

**9. Mayo Clin Proc. 2021 Dec;96(12):3186-3187. doi: 10.1016/j.mayocp.2021.10.007.**

*Adrenal Myelolipoma.*

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**10. Cir Cir. 2021;89(6):728-732. doi: 10.24875/CIRU.20000932.**

*Surgery of the adrenal metastases.*

[Article in English]

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**BACKGROUND:** Adrenal metastases are the most common malignant lesions of the adrenal glands and the second most common tumor after adenomas. The location of the primary tumor is described: lung (39%), breast (35%), gastrointestinal tract, among other. Several studies show that surgery improves survival in selected cases.

**METHOD:** Retrospective and single-center observational study of patients operated for adrenal metastasis over a period of 11 years. The characteristics of the disease and surgical results were described.

**RESULTS:** 14 suprarenalectomies were performed. The average age was 65.85 years. The primary tumors described: non-small cell lung carcinoma (42.8%) and clear cell renal carcinoma (14.20%). In 92.8% the injury was unilateral. In 64.2% it



was metachronous. An initial laparoscopic approach was performed in 85.71%. The morbidity of our series was 14.28%. The median overall survival was 30 months. Survival was 75% per year, 55.5% at 3 years and 40% at 5 years.

CONCLUSIONS: Age, primary location, degree of differentiation, histological type, size greater, laterality, disease-free interval, chemotherapy and surgical technique are not associated with changes in survival. In the presence of a single adrenal mass, surgical evaluation is mandatory and surgery could play a role in patients with metastases in other locations with control of the primary disease.

DOI: 10.24875/CIRU.20000932

PMID: 34851578 [Indexed for MEDLINE]

**11. BMJ Case Rep. 2021 Nov 29;14(11):e245385. doi: 10.1136/bcr-2021-245385.**

*Spontaneous heparin-induced thrombocytopenia with adrenal haemorrhage following orthopaedic surgery: a case report and literature review.*

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A 68-year-old woman was admitted to the hospital for elective total knee arthroplasty in both knees without preceding heparin exposure. She developed adrenal haemorrhage and thrombocytopenia on postoperative day 12, followed by right leg arterial occlusion and multiple venous intra-abdominal sites thrombosis. After given unfractionated heparin to treat arterial occlusion, platelet count was gradually declined. Spontaneous heparin-induced thrombocytopenia was diagnosed by heparin-induced platelet activation test with light transmission aggregometry. The patient was successfully treated with fondaparinux and intravenous immunoglobulin. Apixaban was given after recovery of platelet count. Resolution of both thrombus along aorta and adrenal haemorrhage were shown by CT of whole abdomen after 2 months of treatment. Our case demonstrates that this serious complication is important but seldom recognised early.

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Conflict of interest statement: Competing interests: None declared.

**12. Wiad Lek. 2021;74(9 cz 2):2337.**

*COMPARISON OF THE ONSET OF SENSORY BLOCK USING LIDOCAINE 1.5% WITH ADRENALINE OR LIDOCAINE 1.5% WITH ADRENALINE AND DEXAMETHASONE IN ULTRASOUND GUIDED AXILLARY NERVE BLOCK FOR BELOW ELBOW SURGERIES.*

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**OBJECTIVE:** The aim: To demonstrate the onset of dexamethasone when added to lidocaine in ultrasound regional axillary brachial block.

**PATIENTS AND METHODS:** Materials and methods: 30 patients participated in this study in Al-wasity hospital from June 1st to December 1st 2019; all were of ASA I-II type, aged 18-65 years old. All patients were scheduled for upper limb below elbow surgery with peripheral nerve block. They were divided randomly in to 2 groups: Group A: received 20 ml of lidocaine 1.5% with adrenaline 1:200000; Group 2 : received 20 ml of lidocaine with adrenaline and dexamethasone 8 mg. There was no significant differences among the groups regarding the change in pulse rate, MAP and Oxygen saturation. The group B was faster than group A (p value < 0.001) in both the time of cold sensory block onset and pinprick sensory block onset at all dermatome (C5,C6,C7,C8,T1).

**RESULTS:** Results: A variety of adjuvants have been used with peripheral nerve block to decrease the onset time, improve block quality, and prolong analgesia. Steroids have been shown to be beneficial in improving block onset.

**CONCLUSION:** Conclusions: Adding dexamethasone to lidocaine enhanced the onset time of the block with no hemodynamic effect.

PMID: 34824180 [Indexed for MEDLINE]

**13. J Int Med Res. 2021 Nov;49(11):3000605211055410. doi: 10.1177/03000605211055410.**

*Interdigitating dendritic cell sarcoma located in the adrenal gland: a case report and literature review.*

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We report a case of interdigitating dendritic cell sarcoma (IDCS) originating from the adrenal gland. A 57-year-old middle-aged woman with no previous history of malignancy came to our hospital after color Doppler ultrasound revealed a right adrenal mass. An abdominal computed tomography scan also showed an adrenal mass. Postoperative pathology confirmed the diagnosis of IDCS. After complete surgical removal of the adrenal tumor, the patient has been disease-free for 1 year. IDCS may have a good prognosis after surgical resection. To our knowledge, this is only the second reported case of IDCS in the adrenal region.

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PMID: 34772309 [Indexed for MEDLINE]

Conflict of interest statement: Declaration of conflicting interest: The authors declare that there is no conflict of interest.

**14. Int J Environ Res Public Health. 2021 Oct 23;18(21):11152. doi: 10.3390/ijerph182111152.**

*Surgical Outcomes of Clitoroplasty in Children with Congenital Adrenal Hyperplasia and Clitoral Hypertrophy: A 19-Year Experience of a Single Surgeon.*  
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This study aimed to describe the experience with clitoroplasty for clitoral hypertrophy in patients with congenital adrenal hyperplasia of a single surgeon. The medical records of female pediatric patients with congenital adrenal hyperplasia who underwent clitoroplasty at a tertiary referral hospital between 2002 and 2020 were retrospectively analyzed. Three different surgical techniques were applied for clitoroplasty: recession without reduction, reduction and recession, and girth reduction and recession. A total of 104 patients underwent clitoroplasty for clitoral hypertrophy. The median patient age at the time of surgery was 10 months (range, 4 months to 10 years). The operation time was longer in reduction clitoroplasty than in recession clitoroplasty without reduction (median, 153 vs. 111 min,  $p = 0.003$ ). The mean postoperative pain score of the patients did not differ among the different clitoroplasty techniques. During the mean follow-up of 37.7 months, nine (8.6%) patients underwent re-performed clitoroplasty. The rate of re-performed operation was significantly higher in patients who underwent reduction clitoroplasty (17.3%) than in those who underwent recession without reduction (2%) or girth reduction and recession (0%) ( $p = 0.031$ ). Early clitoroplasty in patients with congenital adrenal hyperplasia yielded good mid-term surgical outcomes in terms of cosmesis and recurrence rate, with minimal perioperative complications.

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**15. Contemp Clin Dent. 2021 Jul-Sep;12(3):308-312. doi: 10.4103/ccd.ccd\_665\_20. Epub 2021 Sep 21.**

*Comparative Evaluation of Effectiveness of 2% Lignocaine Hydrochloride with Clonidine Hydrochloride versus 2% Lignocaine Hydrochloride with Adrenaline Bitartrate as Local Anesthetic for Adult Patients Undergoing Surgical Extraction of Impacted Mandibular Third Molars: A Randomized Controlled Clinical Study.*

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**BACKGROUND AND OBJECTIVES:** Clonidine is a common additive to local anesthetics for various regional and local nerve blocks. However, its effectiveness in

dentistry has not yet been fully explored. Thus, this study was performed to evaluate the quality of anesthesia, vasoconstrictive effects, hemodynamic response, and pain control using a solution of 2% lignocaine hydrochloride with clonidine hydrochloride in comparison with the standard solution of 2% lignocaine hydrochloride and adrenaline bitartrate for pterygomandibular nerve blocks.

**MATERIALS AND METHODS:** A parallel arm, triple-blind randomized controlled study was conducted on 152 patients belonging to ASA-I (American Society of Anesthesiologists) category in the age group of 18-45 years, requiring surgical extraction of impacted mandibular third molars. The patients were divided equally into two groups randomly by computer-generated sequence; Group 1: 2% lignocaine hydrochloride with 1 ml of clonidine hydrochloride (150 µg/ml) and Group 2: 2% lignocaine hydrochloride with adrenaline bitartrate 1: 80,000 (12.5 µg/ml). The variables evaluated were systolic, diastolic, and mean arterial blood pressures, heart rate (HR), blood loss, onset, depth (pain), and duration of anesthesia.

**RESULTS:** There was a statistically nonsignificant difference seen between the two groups ( $P > 0.05$ ) for the onset of anesthesia, pain assessed, and blood loss, whereas a statistically highly significant difference was seen for cardiovascular variables (systolic, diastolic and mean arterial blood pressures, and HR) at various intervals with higher values for Group 2 ( $P < 0.001$ ) and for the duration of action of local anesthesia (LA), with higher values for Group 1 ( $P < 0.001$ ).

**CONCLUSIONS:** Clonidine as an additive to lignocaine has proved to have the onset of action, vasoconstrictive properties, and pain control, equivalent to adrenaline. However, with better stability of hemodynamic variables and prolonged duration of action of LA with clonidine, it can be considered as a better, safer, and more effective additive to lignocaine than adrenaline.

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PMCID: PMC8525814

PMID: 34759690

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## 16. *Int J Hyperthermia*. 2021;38(1):1541-1547. doi: 10.1080/02656736.2021.1993356.

*Comparison between surgery and thermal ablation for adrenal metastases: a retrospective study.*

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**PURPOSE:** To retrospectively compare the efficacy and safety of surgical resection (SR) and thermal ablation for the treatment of adrenal metastases.

**METHODS:** From January 2008 to December 2018, 133 patients with adrenal

metastases who underwent SR (n = 76) or thermal ablation (n = 57) were enrolled. The mean tumor size was 58.00 ± 10.65 mm (22-80 mm) in the SR group and 58.03 ± 12.76 mm (34-89 mm) in the thermal ablation group. Local progression-free survival (LPFS) and safety were compared between the two groups using the Kaplan-Meier method and log-rank tests. Cox proportional hazard regression models were used to evaluate the prognostic factors of LPFS. Complications, hospitalization days, and blood loss were also assessed. RESULTS: The median follow-up was 29.0 months (range, 20.4-37.6 months). No treatment-related mortality was observed. The 1-, 3- and 5-year LPFS rates were 74.0%, 62.8%, and 31.4% in the SR group and 72.8%, 68.7%, and 51.5% in the ablation group, with the median LPFS of 41.5 months (95% CI: 9.3-23.4 months) vs. 47.9 months (95% CI 20.6-75.8 months), respectively (p = 0.784). Tumor size ≥3 cm was the only significant risk factor for LPFS (p = 0.031). The ablation group was superior to the SR group with a lower major complication rate (4.1% vs. 14.5%, p = 0.03), less blood loss (1 ml vs. 100 ml, p < 0.001), and a shorter hospital stay (2 d vs. 6 d, p < 0.001). CONCLUSION: Thermal ablation provided a similar LPFS and less comorbidities than SR, indicating that it is an effective and safe treatment for adrenal metastases.

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**17. Sisli Etfal Hastan Tip Bul. 2021 Sep 24;55(3):325-332. doi: 10.14744/SEMB.2021.13845. eCollection 2021.**

*Hormonally Active Adrenal tumors; Challenges and Outcomes for Different Surgical Approaches.*

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OBJECTIVE: The aim of this study is to compare the intraoperative and short-term outcomes of different surgical approaches for hormone active and non-functional adrenal masses.

METHODS: The data of 206 patients who underwent adrenal gland surgery in our clinic between 2012 and 2020 were retrospectively analyzed. Pre-operative outpatient clinic records of the patients, imaging methods, laboratory results and surgery records, operation time (OT), amount of bleeding, duration of hospital stay, and complications were evaluated. Patients were divided into two groups as those with non-functional mass (n=80) and those with hormoneactive mass (n=126).

RESULTS: The median age of the patients was 52 (range 19-83) and 77.2% of them were female. Tumor size was larger in hormone active group (p=0.311), and the difference was more pronounced in the pheochromocytoma subgroup (p=0.088). The rate of transition to open surgery was similar in both groups (0.959), and no conversion to laparoscopy or conventional open surgery was performed in robotic cases. The duration of surgery (p=0.669), mean amount of blood loss (p=0.834), and mean hospital stay (p=0.195) were also similar between the two groups.

Intraoperative and post-operative complications were similar between two groups ( $p=0.573$  and  $p=0.415$ , respectively). Considering the subgroup analysis of the patients in hormone active group; the duration of hospital stay was longer in patients with Cushing syndrome ( $p=0.001$ ), while there was no difference in OT and estimated blood loss between patients who were operated for Conn, Cushing, and pheochromocytoma ( $p=0.086$  and  $p=0.099$ ; respectively).

CONCLUSION: Surgical results of hormone active adrenal masses were found to be similar to non-functional masses. Although the hormonal condition of the mass does not change the difficulty level of the surgical procedure, it may be recommended that the robotic approach be preferred to facilitate manipulation in these masses.

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**18. Sisli Etfal Hastan Tip Bul. 2021 Sep 24;55(3):286-293. doi: 10.14744/SEMB.2021.64920. eCollection 2021.**

*Impact of the Coronavirus Disease Pandemic on the Annual Thyroid, Parathyroid, and Adrenal Surgery Volume in a Tertiary Referral Endocrine Surgery Center in 2020.*

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OBJECTIVE: The purpose of the study was to evaluate the impact of the coronavirus disease (COVID-19) pandemic on endocrine surgical volumes.

METHODS: There were periodic surgical restriction sin our country in 2020 due to the pandemic. Endocrine surgery volumes at the Division of Endocrine Surgery, Istanbul Medical Faculty were compared between 2019 and 2020.

RESULTS: The surgical volume reduction in 2020 compared to 2019 was 20%, 54.5%, and 40% for thyroid, parathyroid, and adrenal surgery, respectively. Surgical volume for thyroidectomy for benign nodular goiter and parathyroidectomy significantly decreased, whereas adrenal surgery showed no significant difference in 2020 compared to 2019. No significant difference was found in the rates of thyroid cancer and adrenocortical cancer surgery in 2020 compared to 2019.

CONCLUSION: The COVID-19 outbreak led to a significant reduction in the annual rates of parathyroidectomy and thyroidectomy for benign goiter, whereas the volume of thyroid cancer and adrenal surgeries were similar to the previous year.

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**19. Br J Radiol. 2022 Jan 1;95(1129):20210311. doi: 10.1259/bjr.20210311. Epub 2021 Oct 7.**

*Adrenal venous sampling in the diagnostic workup of primary aldosteronism.*

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Primary aldosteronism (PA) is the primary cause of secondary hypertension. The prevalence of PA has probably been underestimated in the past and recent studies suggest that PA could be present in up to 10% of patients suffering from hypertension. Aldosterone excess in PA can be caused by unilateral adrenal disease, usually adrenal adenoma, or bilateral adrenal hyperplasia. Differentiation between unilateral and bilateral disease is clinically important as the former can effectively be treated by removal of the affected adrenal. CT or MRI cannot reliably distinguish unilateral from bilateral disease. Therefore, adrenal vein sampling (AVS) is an important step of the diagnostic work-up in patients with PA. Current guidelines recommend PA in virtually all patients with biochemically diagnosed PA who would undergo adrenal surgery if unilateral PA was diagnosed. In this narrative review, we give an overview of the current technique used for AVS with a focus on the experience with this technique at the University Hospital Basel, Switzerland.

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**20. Front Endocrinol (Lausanne). 2021 Sep 6;12:663096. doi: 10.3389/fendo.2021.663096. eCollection 2021.**

*Surgical Outcomes of Aldosterone-Producing Adenoma on the Basis of the Histopathological Findings.*

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**INTRODUCTION:** Previous studies on the surgical outcomes of aldosterone-producing adenoma (APA) patients were mainly based on the histopathological diagnosis of

HE staining or adrenal venous sampling (AVS) instead of the functional pathology. The aim of the present study was to evaluate the surgical outcomes of APA patients based on the functional pathological diagnosis of APA according to HISTALDO (histopathology of primary aldosteronism) consensus.

**METHODS:** Clinical data of 137 patients with suspected APA were analyzed retrospectively. All patients had hypertension and spontaneous hypokalemia. In all patients, CT showed a unilateral solitary hypodense adrenal lesion, and a contralateral adrenal gland of normal morphology. Tumors were removed and immunostained for CYP11B2, and their pathology were identified based on HISTALDO consensus. Patients were followed up 6 to 24 months after operation.

**RESULTS:** Among 137 cases of presumptive APA diagnosed by CT, 130 (95%) cases were pathologically diagnosed with classical pathology, including 123 APA(90%) and 7 aldosterone-producing nodule (APN) (5%). 7 cases (5%) had non-functioning adenoma (NFA) with aldosterone-producing micronodule (APM) or multiple aldosterone-producing micronodule (MAPM) in the surrounding adrenal tissue. In all 137 patients, hypertension was complete or partial clinical success postoperatively. Complete clinical success was achieved in 73 (53%), and partial clinical success was achieved in 64 (47%) cases. Serum potassium level recovered to normal in all. In 123 patients with APA, complete clinical success was reached in 67 (54%), and partial clinical success was reached in 56 (46%) cases. Gender, duration of hypertension and the highest SBP were significant independent predictors for cure of APA after surgery. A multiple logistic regression model integrating the three predictors was constructed to predict the outcome, which achieved a sensitivity of 72.4% and a specificity of 73.1%.

**CONCLUSION:** The specificity of CT in the diagnosis of APA and APN patients with hypokalemia was 95%. All patients achieved complete or partial clinical success after surgery. Gender, duration of hypertension and the highest SBP were independent predictors for the postoperative cure of APA.

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**21. Natl J Maxillofac Surg. 2021 May-Aug;12(2):255-261. doi: 10.4103/njms.NJMS\_7\_20. Epub 2021 Jul 15.**

*A clinical comparative study of dexmedetomidine as an adjuvant to 2% plain lignocaine and 2% lignocaine with 1:200,000 adrenaline as local anesthetic agents for surgical removal of impacted mandibular third molars.*

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**INTRODUCTION:** Dexmedetomidine is a selective alpha-2 adrenoceptor agonist. It is conventionally used as a sedative in the intensive care unit. However, recently, the application of dexmedetomidine as an adjuvant to a local anesthetic agent



has been studied. The present study intends to evaluate the effectiveness of dexmedetomidine as an adjuvant to 2% plain lignocaine for surgical removal of impacted mandibular third molar and to compare the efficacy of dexmedetomidine with 2% plain lignocaine with 2% lignocaine and 1:200000 adrenaline.

**MATERIALS AND METHODS:** A total of 80 patients who required surgical removal of impacted mandibular third molar extraction were included in the study. Patients were randomly divided into two groups using a computer-generated table. Patients in the study group received 2% plain lignocaine with 1 mcg/ml dexmedetomidine. Patients in the control group received 2% lignocaine with 1:200000 adrenaline. The parameters evaluated were onset and duration of action, pulse rate, blood pressure, oxygen saturation, and blood loss.

**RESULTS:** Onset of action was faster and the duration of action was longer when dexmedetomidine was used with lignocaine as a local anesthetic agent. The vital parameters in both the groups were stable. Bleeding at the surgical site was less in the dexmedetomidine group.

**CONCLUSION:** The study concluded that the combination of dexmedetomidine with lignocaine enhances the local anesthetic potency of lignocaine when injected for nerve blocks.

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**22. J Vet Intern Med. 2021 Sep;35(5):2159-2166. doi: 10.1111/jvim.16256. Epub 2021 Sep 2.**

*Retrospective study of aldosterone and progesterone secreting adrenal tumors in 10 cats.*

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**BACKGROUND:** Primary hyperaldosteronism caused by adrenal neoplasia has been well described in cats. Multiple corticosteroid abnormalities occur in a subset of affected cats, but characterizations of this syndrome are limited to several case reports.

**OBJECTIVES:** To describe a series of cats with adrenal tumors secreting aldosterone and additional corticosteroids.

**ANIMALS:** Ten cats with multiple corticosteroid secreting adrenocortical tumors.

**METHODS:** Retrospective case series. Medical records of cats with adrenal tumors secreting both aldosterone and progesterone were identified. Data concerning

historical findings, clinicopathologic features, treatments, and outcomes were retrieved from medical records.

**RESULTS:** All 10 cats had diabetes mellitus in addition to biochemical features of hyperaldosteronism such as hypokalemia. High corticosterone concentrations were observed in all 3 cats in which this corticosteroid was measured.

Ultrasound examinations revealed unilateral adrenal tumors in all 10 cases, and the contralateral adrenal gland was either atrophied or not identified in 5 cats. Three of 4 cats developed hypoadrenocorticism after surgical adrenalectomy. Three cats achieved diabetic remission after adrenalectomy. Two cats treated with adrenalectomy survived >1 year, 1 cat survived 6.5 months, and 1 cat was alive 5.5 months after diagnosis. Survival >1 year occurred in 2 of 4 cats treated with medical management alone. Two cats were not treated.

**CONCLUSIONS AND CLINICAL IMPORTANCE:** The presence of multiple corticosteroid abnormalities should be considered in cats with aldosterone secreting adrenal tumors, especially those with concurrent diabetes mellitus. Both surgical and medical management can result in long-term survival, although diabetic remission was documented only in cats undergoing adrenalectomy.

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Conflict of interest statement: Authors declare no conflict of interest.

**23. Circulation. 2021 Aug 17;144(7):580-582. doi: 10.1161/CIRCULATIONAHA.121.054318. Epub 2021 Aug 16.**

*Catheter-Based Adrenal Ablation Remits Primary Aldosteronism: A Randomized Medication-Controlled Trial.*

Zhao Z(#)(1), Liu X(#)(1), Zhang H(1), Li Q(1), He H(1), Yan Z(1), Sun F(1), Li Y(1), Zhou X(1), Bu X(1), Wu H(1), Shen R(2), Zheng H(2), Yang G(3), Zhu Z(1); Chongqing Endocrine Hypertension Collaborative Team.

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**24. Medicine (Baltimore). 2021 Aug 6;100(31):e26838. doi: 10.1097/MD.00000000000026838.**

*Bilateral adrenal metastasis of renal cell carcinoma 4 years after radical nephrectomy: A case report and review of literature.*

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**RATIONALE:** Renal cell carcinoma (RCC) almost metastasizes to every organ, the possibility of adrenal metastasis is relatively low in patients that have undergone radical nephrectomy, only a few cases of bilateral adrenal metastasis are reported on literature. Although surgical treatment of metastases from RCC is preferred and contributes to the rate of survival, it is considered challenging to manage such cases due to the rarity of bilateral metastasis to the adrenal glands.

**PATIENT CONCERNS:** A 64-year-old Manchus female presented with an incidental ultrasonic finding of a left adrenal mass 4 years after radical nephrectomy for left renal cell carcinoma.

**DIAGNOSIS:** Abdominal contrast enhanced CT scan revealed bilateral adrenal masses, suggesting metastatic lesion. Examinations indicated neither local recurrence nor distant metastasis anywhere have been detected by whole body Positron Emission Tomography/Computed Tomography (PET/CT) scan except high radioactive uptake in bilateral adrenal glands.

**INTERVENTIONS:** Metachronous bilateral adrenalectomy was taken and laparoscopic right adrenalectomy was first performed. She was discharged home on third postoperative day. Pathological examination revealed metastatic renal cell carcinoma. Two months later she was performed laparoscopic left adrenalectomy.

**OUTCOMES:** The patient healed without obvious complications and no tumor recurrence.

**LESSONS:** Bilateral metastatic adrenal recurrence from RCC is very rare. Early diagnosis of adrenal metastasis is challenging because they are usually silent both anatomically and functionally. Surgical intervention is a wise option for these patients that may improve survival, and metachronous bilateral adrenalectomy is proved to be safe and effective.

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**25. J Dent Anesth Pain Med. 2021 Aug;21(4):337-344. doi:**

**10.17245/jdapm.2021.21.4.337. Epub 2021 Jul 30.**

*Comparison of clinical efficacy of ropivacaine and lignocaine with adrenaline for implant surgery anesthesia: a split-mouth randomized controlled clinical trial.*

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**BACKGROUND:** The primary indication for using long-acting anesthetics in dentistry is extensive dental procedures that require pulpal anesthesia beyond 90 min and management of postoperative pain. Ropivacaine is an amide local

anesthetic that is available at various concentrations with inherent vasoconstrictive properties at low concentrations. Ropivacaine has a 75% greater margin of safety than bupivacaine. Ropivacaine can be a good alternative to bupivacaine as a local anesthetic in dental implant surgery as it provides a longer duration of both pulpal and soft tissue anesthesia after mandibular nerve block and lowers CNS and cardiovascular toxicity. This study aimed to evaluate and compare the clinical efficacy of ropivacaine and lignocaine for implant surgery anesthesia.

**METHODS:** Fifteen patients with bilateral edentulous sites indicated for implant placement were recruited for this study. Patients aged 20-60 years of both sexes were randomly recruited. Thirty implant placements were performed in the test and control groups using ropivacaine and lignocaine with adrenaline as local anesthetics, respectively.

**RESULTS:** The results were analyzed statistically. The duration of anesthesia was significantly higher in the test group than in the control group. Ropivacaine was found to be superior to lignocaine in terms of the quality of anesthesia. The comparison of mean visual analog scale scores showed ropivacaine to have better anesthetic and analgesic effects than the control group.

**CONCLUSION:** Ropivacaine 0.75% provides a significantly longer duration of anesthesia than lignocaine 2% with adrenaline. Ropivacaine 0.75% decreased intraoperative and postoperative analgesia compared to lignocaine 2% with adrenaline. Hence, ropivacaine 0.75% can be used as an alternative to lignocaine in implant surgeries and other intraoral surgical procedures that require a longer duration of anesthesia and analgesia.

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**26. BMC Endocr Disord. 2021 Aug 12;21(1):163. doi: 10.1186/s12902-021-00818-2.**

Concurrence of overt Cushing's syndrome and primary aldosteronism accompanied by aldosterone-producing cell cluster in adjacent adrenal cortex: case report.

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**BACKGROUND:** Various adrenal disorders including primary aldosteronism and Cushing's syndrome lead to the cause of hypertension. Although primary aldosteronism is sometimes complicated with preclinical Cushing's syndrome, concurrence of overt Cushing's syndrome and primary aldosteronism is very rare. In addition, it has been drawing attention recently that primary aldosteronism is brought about by the presence of aldosterone-producing cell cluster in adjacent adrenal cortex rather than the presence of aldosterone-producing adenoma.

CASE PRESENTATION: A 67-year-old Japanese female was referred to our institution due to moon face and central obesity. Based on various clinical findings and data, we diagnosed this subject as overt Cushing's syndrome and primary aldosteronism. Furthermore, in immunostaining for cytochrome P450 (CYP) 11B1, a cortisol-producing enzyme, diffuse staining was observed in tumorous lesion. Also, in immunostaining for CYP11B2, an aldosterone-producing enzyme, CYP11B2 expression was not observed in tumorous lesion, but strong CYP11B2 expression was observed in adjacent adrenal cortex, indicating the presence of aldosterone-producing cell cluster.

CONCLUSIONS: We should bear in mind the possibility that concurrence of overt Cushing's syndrome and primary aldosteronism is accompanied by aldosterone-producing cell cluster in adjacent adrenal cortex.

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**27. Am J Surg. 2021 Aug 4:S0002-9610(21)00463-3. doi: 10.1016/j.amjsurg.2021.08.004. Online ahead of print.**

*The adrenal incidentaloma: An opportunity for surgeons to improve patient care.*

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**28. Sex Dev. 2021;15(4):229-235. doi: 10.1159/000517055. Epub 2021 Jul 21.**

*Surgical Practice in Girls with Congenital Adrenal Hyperplasia: An International Registry Study.*

Hebenstreit D(1), Ahmed SF(2), Krone N(3), Krall C(4), Bryce J(2), Alvi S(5), Ortolano R(6), Lima M(7), Birkebaek N(8), Bonfig W(9)(10), Claahsen van der Grinten H(11), Costa EC(12), Poyrazoglu S(13), de Vries L(14), Flück CE(15), Guran T(16), Bugrul F(16), Güven A(17), Iotova V(18), Koehler B(19), Schröder JT(19), Konrad D(20), Gevers E(21)(22), Krone R(23), Milenkovic T(24), Vieites A(25), Ross R(3), Tadokoro Cuccaro R(26), Hughes I(26), Acerini C(26), Springer A(27).

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In this article international trends in surgical practice in girls with congenital adrenal hyperplasia (CAH) are evaluated. All cases that had been classified in the I-CAH/I-DSD registry as 46,XX CAH and who were born prior to 2017 were identified. Centers were approached to obtain information on surgical decision making. Of the 330 included participants, 208 (63.0%) presented within the first month of life, and 326 (98.8%) cases were assigned female. Genital

surgery had been performed in 250 (75.8%). A total of 64.3, 89.2, and 96.8% of cases residing in Europe, South America and Asia, respectively, had at least one surgery. In a logistic regression model for the probability of surgery before the second birthday (early surgery) over time an increase of probability for early vaginal surgery could be identified, but not for clitoral surgery or both surgeries combined. Genitoplasty in girls with CAH remains controversial. This large international study provides a snapshot of current practice and reveals geographical and temporal differences. Fewer surgeries were reported for Europe, and there seems to be a significant trend towards aiming for vaginal surgery within the first 2 years of life.

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**29. JAMA Surg. 2021 Nov 1;156(11):1061-1062. doi: 10.1001/jamasurg.2021.3595.**

*Review of Surgical Therapy of Adrenal Tumors in Guidelines From the German Association of Endocrine Surgeons.*

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PMID: 34347014

**30. Cryobiology. 2021 Oct;102:68-75. doi: 10.1016/j.cryobiol.2021.07.011. Epub 2021 Jul 27.**

*Comparison between slow and rapid freezing for adrenal gland cryopreservation and xenotransplantation.*

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The aim of our study was to examine whether slow or rapid cryopreservation of adrenal xenografts affected xenotransplant outcome. Adrenal xenografts were got from newborn piglets (<24 h after birth). Receptor rats were randomly divided into four groups: a bilateral adrenalectomy group, fresh xenotransplantation group, rapid cryopreservation xenotransplantation group, and a slow cryopreservation xenotransplantation group. 30 days after xenotransplantation, the survival rates of rats in the fresh xenotransplantation group, rapid cryopreservation xenotransplantation group and slow cryopreservation xenotransplantation group were 80 %, 60 % and 60 %, respectively, which were significantly higher than 40 % of the bilateral adrenalectomy group. In addition, the survival rate of rats in the slow cryopreservation group was

consistently significantly higher than that in the rapid cryopreservation group at 29 days after xenotransplantation. Morphological observation showed that there were a few medulla cells existed in the adrenal glands in the slow cryopreservation group after 30 days of xenotransplantation, but no medulla cells were found in the rapid cryopreservation group. The plasma cortisol level of rats in the fresh xenotransplantation group and the slow xenotransplantation group 30 days after xenotransplantation was significantly higher than that of the rapid cryopreservation group and bilateral adrenalectomy group ( $P < 0.05$ ). The levels of liver glycogen and cholesterol in the xenotransplantation rats were increased relative to those of the bilateral adrenalectomy rats, and close to normal level. In conclusion, compared with rapidly frozen preserved grafts, slowly frozen preserved grafts not only ensure the structural integrity of adrenal tissues, but also have corresponding physiological functions, which provide a basic research opportunities for the preservation of xenografts and the treatment of adrenal corticosteroid deficiency. Moreover, these findings can provide evidence for xenotransplantation in the treatment of Addison's disease (adrenal cortex hormone deficiency).

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**31. Int J Surg Case Rep. 2021 Aug;85:106187. doi: 10.1016/j.ijscr.2021.106187. Epub 2021 Jul 8.**

*Adrenal adenoma as a cause of atypical psychosis: Presentation, diagnosis, surgical technique and outcome (case report with a brief literature review).*

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**INTRODUCTION AND IMPORTANCE:** Psychiatric symptoms may be a mode of the revelation of several endocrinopathies, but rarely in primary hyperaldosteronism, which can increase psychiatric comorbidity, as well as cardiovascular risk.

**CASE PRESENTATION:** We report a case of a 26-year-old engineer, who suffered from atypical psychosis before being hospitalized for a state of agitation, he presented with high blood pressure and severe hypokalemia. An etiological assessment revealed a right adrenal adenoma, which was afterward resected, with a very good evolution.

**CLINICAL DISCUSSION:** In this association, a high-level of aldosterone and



hypokalemia can be behind these manifestations that present in an atypical form. Treatment is medical by anti-aldosterone or surgical by resection of the adenoma, but the challenge now is to know if we can or not stop psychotropic treatment after the treatment of the adenoma. In our case, the treatment was stopped six months after the resection of the adenoma, with very good outcomes until now.

CONCLUSION: Despite the high prevalence of psychiatric illnesses, it is always necessary to look for the organic causes that may be behind these pathologies, especially if they are in atypical forms. LEARNING POINTS.

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**32. J Investig Med High Impact Case Rep. 2021 Jan-Dec;9:23247096211034337. doi: 10.1177/23247096211034337.**

*A Real Saline Challenge: Diagnosing Primary Aldosteronism in the Setting of Chronic Kidney Disease.*

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Primary aldosteronism (PA) is the most common cause of secondary hypertension but remains largely undiagnosed. Chronic kidney disease (CKD) complicates the diagnosis of PA by affecting the biochemical screening evaluation and confirmatory testing, and by increasing the complication rate of adrenal venous sampling (AVS). To raise clinician awareness of the challenges of PA diagnosis in CKD, we present an illustrative case with subsequent review of the literature and discuss some recent developments in PA diagnostic strategies particularly applicable to the CKD population. A 67-year-old man with stage IIIb CKD was suspected of having PA due to treatment with 6 antihypertensive agents and the presence of intermittent hypokalemia. He had a positive biochemical screen for PA, and AVS demonstrated unilateral aldosterone excess. Subsequently, unilateral adrenalectomy resolved his PA, eliminating the patient's hypokalemia and improving his blood pressure. A MEDLINE literature search revealed 10 studies totaling 11 cases (including our own) of PA diagnosed in the setting of CKD. For each case, the clinical presentation, biochemical data, results of cross-sectional imaging, AVS details, and clinical response to surgery or medical therapy were characterized. The optimal strategy for the diagnosis and management of PA patients with CKD is not known. Although CKD patients often receive screening and subtype testing for PA similar to non-CKD patients, there are challenges in the interpretation of these tests. Novel strategies may include less invasive subtype testing or empiric treatment with mineralocorticoid receptor antagonists but additional studies are necessary.

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**33. Gland Surg. 2021 Jun;10(6):1910-1919. doi: 10.21037/gs-20-829.**

*Should surgical drainage after lateral transperitoneal laparoscopic adrenalectomy be routine?—A retrospective comparative study.*

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**BACKGROUND:** Whether to use surgical drains after abdominal surgery or not has received much attention since a hundred years ago. Nowadays, lateral transperitoneal laparoscopic adrenalectomy (LTLA) is a widely used technique to treat adrenal tumors worldwide. However, the placement of drains after LTLA remains controversial.

**METHODS:** Data of 150 patients, who underwent LTLA between October 2014 and September 2020 by the same lead surgeon, were collected, including demographic, pathology, preoperative, operative variables and postoperative complications. The patients were divided into two groups, with and without drainage. The postoperative recovery of the two groups was compared.

**RESULTS:** Among 150 patients (65 men and 85 women, median age 48 years, median BMI 23.53), 89 patients had no drainage and 61 patients had drainage after surgery. Variables of the two groups were analyzed. Placement of drains correlated with long operative time ( $P < 0.01$ ). Patients with drain had longer hospital stays ( $P < 0.001$ ) and a higher incidence of postoperative complications ( $P = 0.022$ ). Other factors, including tumor size ( $P = 0.61$ ), tumor location ( $P = 0.387$ ), ASA score ( $P = 0.687$ ), pathology ( $P = 0.55$ ), VAS pain score ( $P = 0.41$ ), intraoperative blood loss ( $P = 0.11$ ), were not found to be significantly associated with drain placement. There was no conversion to open surgery in both groups. Moreover, no mortality was observed in either group.

**CONCLUSIONS:** This study revealed that it is feasible and safe not to leave a drain in selective and uncomplicated patients and that surgical drainage should not be routine after LTLA.

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PMID: 34268075

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**34. Int J Urol. 2021 Oct;28(10):1032-1038. doi: 10.1111/iju.14642. Epub 2021 Jul 10.**

*Nonuse of antimicrobial prophylaxis in clean surgeries for adrenal and renal tumors: Results of the risk-based strategy in 1362 consecutive patients.*

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**OBJECTIVES:** To evaluate the incidence of perioperative infections without antimicrobial prophylaxis in patients undergoing clean surgeries for adrenal and renal tumors.

**METHODS:** We prospectively enrolled 1362 consecutive patients who underwent minimally invasive adrenalectomy (n = 303), radical nephrectomy (n = 499), and partial nephrectomy (n = 560) using the gasless laparoendoscopic single-port surgery technique between 2005 and 2019. In 1059 patients, antimicrobial prophylaxis was not administered. The remaining 303 patients were considered at high risk for infection and received single-dose antimicrobial prophylaxis. The endpoint was the incidence of perioperative infections within 1 month from the surgery date. Perioperative infections were classified into surgical site infections, urinary tract infections, and remote infections.

**RESULTS:** Seventy-four patients whose collecting systems were opened during partial nephrectomy were excluded, and the remaining 1013 patients with nonuse of antimicrobial prophylaxis and 275 patients with single-dose antimicrobial prophylaxis were retrospectively analyzed. The incidence of superficial surgical site infections, deep/organ-space surgical site infections, urinary tract infections, and remote infections was 1.6%, 0.7%, 2.8%, and 1.3%, respectively, in patients with nonuse of antimicrobial prophylaxis and 0.4%, 1.8%, 1.5%, and 1.5%, respectively, in patients with single-dose antimicrobial prophylaxis. All patients who developed perioperative infections were successfully treated. No clinical or surgical variables were significantly associated with the incidence of surgical site infections. One limitation of the present study was its nonrandomized and noncontrolled design.

**CONCLUSIONS:** In minimally invasive clean surgeries for adrenal and renal tumors, antimicrobial prophylaxis is not necessary when individual risk of infection is considered low.

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**35. Clin Radiol. 2021 Nov;76(11):829-837. doi: 10.1016/j.crad.2021.06.004. Epub 2021 Jul 7.**

*Percutaneous image-guided radiofrequency ablation for adrenal tumours: a*

*systematic review.*

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**AIM:** To undertake a systematic review of the technical success and technique efficacy rates of percutaneous image-guided radiofrequency ablation (RFA) for adrenal tumours.

**MATERIALS AND METHODS:** Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, the electronic databases MEDLINE, EMBASE, and PubMed were searched for relevant studies from inception to the third week of January 2020. Only studies reporting effectiveness rates of percutaneous RFA for adrenal tumours were included. Data regarding sample size, tumours, effectiveness rates, outcomes, and complications were extracted in duplicate and recorded.

**RESULTS:** A total of 15 studies evaluating 292 individuals with 305 tumours were included. Patient selection criteria included age  $\geq 18$  years, contraindication to surgical intervention, and no uncorrected coagulopathy. Cumulative technical success, primary technique efficacy, and secondary technique efficacy rates were 99%, 95.1% and 100%, respectively, indicating optimal immediate control of adrenal tumours. Technical success and technique efficacy rates of primary adrenal tumours were higher than adrenal metastases; however, formal statistical analyses were precluded due to lack of comparative studies. Local tumour progression rates for adrenal metastases were 20.3% at 3 months, 26.3% at 6 months, and 29.3% at 12 months. Overall survival rates for adrenal metastases were 81.8% at 6 months, 59.6% at 12 months, and 62.9% at 18 months. The intraprocedural complication rate was 30.2%, with the most frequency reported complication being procedural hypertensive crisis.

**CONCLUSION:** The findings of this study suggest percutaneous image-guided RFA is a safe and efficacious procedure. Further studies are warranted to define patient selection criteria and long-term outcomes.

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**36. Eur J Endocrinol. 2021 Aug 3;185(3):405-412. doi: 10.1530/EJE-21-0338.**

*Somatic mutations in adrenals from patients with primary aldosteronism not cured after adrenalectomy suggest common pathogenic mechanisms between unilateral and bilateral disease.*

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**OBJECTIVE:** Primary aldosteronism (PA) is the most common form of secondary and curable hypertension. Different germline and somatic mutations are found in aldosterone-producing adenoma (APA) and familial forms of the disease, while the causes of bilateral adrenal hyperplasia (BAH) remain largely unknown. Adrenalectomy is the recommended treatment for patients with APA; however, 6% of patients are not cured and show persistent PA after surgery suggesting BAH. The objective of this study was to analyze clinical data of patients with APA without biochemical success after adrenalectomy as well as the histological and genetic characteristics of their adrenal glands.

**DESIGN AND METHODS:** Clinical data of 12 patients with partial and absent biochemical cure were compared to those from 39 PA patients with hormonal cure after surgery. Histological, morphological, and genetic characterization of the adrenals was carried out by CYP11B2 and CYP11B1 immunostaining and by CYP11B2-guided NGS.

**RESULTS:** Patients with absent hormonal cure displayed a longer duration of arterial hypertension and lower lateralization index of aldosterone production. In ten patients, APAs expressing CYP11B2 were identified. No difference in histological and morphological characteristics was observed between patients with or without a hormonal cure. Somatic mutations in APA driver genes were identified in all CYP11B2 positive APAs; CACNA1D mutations were the most frequent genetic abnormality.

**CONCLUSIONS:** Patients with partial and absent biochemical cure were diagnosed later and exhibited a lower lateralization index of aldosterone production, suggesting asymmetric aldosterone production in the context of BAH. Somatic mutations in adrenal glands from those patients indicate common mechanisms underlying BAH and APA.

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PMID: 34232123 [Indexed for MEDLINE]

**37. Int J Med Sci. 2021 Jun 16;18(13):3026-3038. doi: 10.7150/ijms.60261.**

**eCollection 2021.**

*The underlying molecular mechanism and drugs for treatment in adrenal cortical carcinoma.*

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**Purpose:** The study aimed to predict and explore the possible clinical value and mechanism of genetic markers in adrenal cortical carcinoma using a bioinformatics analysis method. **Methods:** The RNA-seqs and miRNAs data were

downloaded from TCGA database to identify the differentially expressed genes and differentially expressed miRNAs. The hub-genes were screened by building protein-protein interaction sub-networks with 12 topological analysis methods. We conducted the receiver operating characteristic curve to evaluate the diagnostic value of hub-genes in distinguishing the death and alive groups. The survival analysis of hub-genes and key miRNAs were conducted using Kaplan-Meier curves. Furthermore, most significant small molecules were identified as therapeutic candidates for adrenal cortical carcinoma by the CMap analysis. Results: Compared to survival group, we found 475 up-regulated genes and 354 genes and the key pathways leading to the death of different ACC individual patients. Then we used 12 topological analysis methods to found the most possible 22 hub-genes. Among these hub-genes, nine hub-genes (C3, CXCL5, CX3CR1, GRM8, HCAR2, HTR1B, SUCNR1, PTGER3 and SSTR1) could be used to distinguish the death and survival groups for patients. We also revealed that mRNA expressions of 12 genes (C3, CXCL8, CX3CR1, GNAT3, GNGT1, GRM8, HCAR2, HTR1B, HTR1D, PTGER3, SSTR1 and SUCNR1) and four key miRNAs (hsa-mir-330, hsa-mir-489, hsa-mir-508 and hsa-mir-513b) were related to survival. Three most small molecules were identified (H-9, AZ-628 and phensuximide) as potential therapeutic drugs for adrenal cortical carcinoma. Conclusion: The hub-genes expression was significant useful in adrenal cortical carcinoma, provide new diagnostic, prognosis and therapeutic approaches for adrenal cortical carcinoma. Furthermore, we also explore the possible miRNAs involved in regulation of hub-genes.

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**38. J Clin Endocrinol Metab. 2021 Oct 21;106(11):e4340-e4349. doi: 10.1210/clinem/dgab482.**

*Identification of Surgically Curable Primary Aldosteronism by Imaging in a Large, Multiethnic International Study.*

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**CONTEXT:** Adrenal gland imaging is recommended by the current guidelines for the workup of primary aldosteronism (PA). However, its diagnostic performance has not been established in large, multiethnic cohorts of patients who undergo adrenal vein sampling (AVS) and adrenalectomy.

**OBJECTIVE:** This work aims to assess the diagnostic accuracy of cross-sectional adrenal imaging.

**METHODS:** This international multicenter study took place in tertiary referral centers. A total of 1625 PA patients seeking surgical cure were enrolled in an international study involving 19 centers in North America, Europe, Asia, and Australia. Of these, 1311 (81%) had imaging data available and 369 (23%), who received a final diagnosis of surgically cured unilateral PA, were examined. Patients underwent AVS and imaging by computed tomography and/or magnetic

resonance imaging. The accuracy of detection of unilateral PA at imaging was estimated by the area under the receiver operator characteristics curve using cure (biochemical and/or full clinical success) as the reference at follow-up after unilateral adrenalectomy.

**RESULTS:** In the cohort of 1311 patients with imaging data available, 34% and 7% of cases showed no detectable or bilateral nodules, respectively. Imaging did not detect the culprit adrenal in 28% of the surgically cured unilateral PA patients. Moreover, the clinical outcome did not differ significantly between the imaging-positive and imaging-negative patients.

**CONCLUSION:** Cross-sectional imaging did not identify a lateralized cause of disease in around 40% of PA patients and failed to identify the culprit adrenal in more than one-fourth of patients with unilateral PA.

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