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REPORT ON BEST PRACTICES IN ADRENAL SURGERY

JULY 2022

1. BACKGROUND TO THIS DOCUMENT

The Best Practices in Adrenal Surgery Short Life Working Group (SLWG) convened following a request of the RCSI Council. The SLWG aimed to provide recommendations to RCSI on best practices in Adrenal Surgery with a particular focus on endocrine adrenal surgery. The agreed output of the SLWG is a short document outlining the current service, relevant issues and recommendations for the future. The Terms of Reference for the SLWG are included in appendix 1.

1.1. OVERVIEW OF THE ADRENAL GLANDS AND THE ENDOCRINE SYSTEM

The adrenal glands are small triangular organs located on top of each kidney and form part of the endocrine system, which is a collection of glands that produce hormones.

The adrenal glands are responsible for numerous hormone-related functions in the body. As a result, disorders that affect adrenal glands can have a broad impact on an individual's health.

Each adrenal gland contains an outer adrenal cortex that synthesizes steroid hormones, including aldosterone, cortisol and sex steroids. Each gland also contains an inner adrenal medulla, which produces catecholamines, including adrenaline and noradrenaline.

Aldosterone helps control blood pressure by managing the balance of potassium and sodium in the body. Cortisol works in conjunction with adrenaline and noradrenaline to help regulate the reaction to stress. Cortisol also helps regulate metabolism, glucose levels, and blood pressure. Both of these hormones are essential for life.

1.2. ADRENAL GLAND DISORDERS LAY SUMMARY

Adrenal gland disorders develop when:

- The pituitary gland fails to control hormone production properly (either too much or too little)
- Benign or non-cancerous tumour growth in the adrenal glands
- Malignant or cancerous tumour growth in the adrenal glands
- Infections develop in the adrenal glands
- Inheritance of certain genetic mutations e.g. MEN2A / 2B, VHL, NF, SDHx etc.

1.3. ADRENAL MEDICAL CONDITIONS:

- Addison's disease: This is a rare condition in which the adrenal gland is damaged leading to underproduction of hormones. The most common form is an autoimmune self-destructive disease, in which the body's immune system may attack the adrenal tissue; hence the adrenal glands do not produce enough cortisol, aldosterone or sex steroids
- Cushing's syndrome: This rare disorder occurs when the adrenal glands produce too much cortisol. Long-term steroid medication use can cause similar symptoms.
- Adrenal adenomas – these are common adrenal lesions. They are benign tumours in which a non-cancerous lesion grows in the adrenal cortex. In a small percentage of cases, surgical removal to treat the underlying hormone excess may be required.
- Pheochromocytoma: In this condition, tumours develop in the medulla of the adrenal glands. These tumours are rarely cancerous and frequently have an underlying genetic preponderance.
- Adreno-cortical cancer: This is a rare condition in which a malignant tumour develops in an adrenal gland.

2. RELATIONSHIP BETWEEN THE ENDOCRINE SYSTEM AND ADRENAL SURGERY

Endocrine surgical procedures are carried out on the thyroid, parathyroid, adrenal and pituitary glands and pancreas. They also include excision of tumours elsewhere (paraganglioma for example, which are tumours that in some cases produce adrenaline and can occur in the head, neck, chest or abdomen that may cause hormonal dysfunction).

The overlap between endocrinology and other surgical specialities means that surgeons with a range of clinical backgrounds may perform endocrine procedures, but it should be noted that the general surgery curriculum allows specialist training and examination in endocrine surgery as a distinct sub-speciality. General surgery trainees who have taken this part of the Intercollegiate Fellowship exam of the Royal College of Surgeons (FRCS) are often called endocrine surgeons.

Research has shown over the years that the risk of complications in surgery is directly related to the surgeon's volume and experience. Since adrenal surgery is relatively uncommon, it is critical to find a surgeon who specializes in this type of operation. In experienced hands, the complications arising from adrenal surgery, especially laparoscopic adrenalectomy, are low. As with any operation, there is a risk of infection and bleeding. Wound infections and abscess formation occurs in about 1 to 2% of cases but are more likely in open operations. Infections are more common in patients with Cushing's Syndrome because this disease causes poor wound healing.

3. THE NEED FOR THESE GUIDELINES: CURRENT CHALLENGES AND OPPORTUNITIES

Within the Republic of Ireland, adrenal surgery is undertaken in some high volume centres and some low volume centres across the health service. Increased radiological imaging of the abdomen has seen a dramatic increase in the number of adrenal incidentalomas that require further investigation (the vast majority of these will not require surgical resection). Minimally invasive adrenalectomy has become the standard of care internationally for small adrenal lesions and is associated with early mobilization, reduce post-operative pain and shorter length of hospital stay. Larger and malignant adrenal lesions may still require an open adrenalectomy.

3.1. PATIENT PATHWAY AND REFERRALS

Capacity problems and significant delays in outpatients can delay the patient pathway. Clear and appropriate patient pathways are vital to ensure that patients receive a timely referral, diagnosis and treatment in line with best practice. It is particularly important that the pathway leads directly to referral to a specialist centre where appropriate. There are referral pathways for adrenal conditions, but they are not consistently applied in Ireland, which indicates a need for a standardised approach. For serious endocrine conditions, a delayed referral can be fatal.

Where surgery is indicated, the pathway should be well defined at every stage, i.e. through pre-assessment, surgery, post-operative care, discharge and follow-up. Endocrinologists should refer to surgeons who can demonstrate through audit that they operate on an 'adequate number' of patients and achieve good outcomes. This is particularly important where surgery is for rarer/more complex conditions such as Pheochromocytoma/ Paraganglioma and adrenocortical carcinoma. We outline what constitutes an 'adequate number' for various types of surgery in the section on concentrating key procedures.

In all cases where surgery or treatment is advised, it is important that the decision-making around this is patient-centred, via a formal multidisciplinary team discussion, and that the patient has been given information about their diagnosis and treatment options. Patients should also be given a point of contact to raise questions between appointments – ideally an endocrine clinical nurse specialist.

3.2. INVESTIGATIONS

After performing a very careful clinical assessment of the patient to see if they have any signs and symptoms of adrenal hormone excess, the next step is to perform laboratory testing to see if the adrenal tumour is overproducing any hormones. Knowing what hormone is being produced (if any), and how much is critically important. A history of a prior or current cancer diagnosis in another organ is key to the assessment of adrenal lesions. A detailed family history is required given the increasing numbers of genetic conditions associated with adrenal tumours.

Adrenal tumours and adrenal masses require a thorough investigation by an endocrinologist to determine if the tumour is producing any hormone, and which adrenal hormone is being produced. The quantity of adrenal hormone produced by the tumour (if any) will play a major role in deciding if adrenal surgery is necessary.

Endocrine Investigations should include:

Zona glomerulosa: Screening test plasma renin activity/concentration and aldosterone. (Should be performed irrespective of interfering anti-hypertensives/medications)

Zona Fasciculata: 1mg dexamethasone suppression test, ACTH (also some centres may use 24-hour urinary free cortisol and midnight salivary cortisol)

Zona Reticularis: testosterone, DHEAS, androstenedione, 17-OHP

Adrenal medulla: plasma metanephrines/ normetanephrines and 3-metoxytyramine or 24-hour urinary catecholamines/ metanephrines

3.3. SURGERY

Adrenal surgery is complex and requires the surgeon to customize the operation to each patient. The specific adrenal operation used will be dictated by the size of the adrenal tumour, what hormone the adrenal is overproducing, and whether or not cancer is suspected.

Adrenal surgery is performed by general surgeons, endocrine surgeons, HPB surgeons and in some cases urologists. The experience and volume of the surgeon in adrenal operations is by far the most important criterion. It is well known that surgeons who perform many adrenalectomies, perform the operation much more safely, have fewer complications and the patients do better postoperatively.

The specific adrenal surgical technique used will be dictated by the situation at hand. It is crucial that the adrenal surgeon is comfortable with all the different techniques of adrenal surgery since a customized, individual approach will give the best possible outcome. Adrenal surgery should be tailor-made for the patient and the specific tumour.

The setting is important here particularly in terms of pre, peri and post-operative management being multidisciplinary with appropriate endocrine and anaesthetic expertise and support.

While surgeon volume is clearly important, hospital expertise/volume and a functioning MDT system is as, if not more important.

3.4. PERI-OPERATIVE CARE

The provision of safe anaesthesia for adrenal surgery is dependent on a multi-disciplinary team approach as recommended in these national guidelines. Broadly speaking, the conduct of anaesthesia is dependent on whether the adrenal tumour is functioning or non-functioning. Provision of anaesthesia for the resection of non-functioning tumours should follow the principles for general abdominal surgery and no further measures are required. The provision of anaesthesia for the resection of functioning tumours is dependent on the confirmed hormone that is being secreted excessively and the physiological consequences of its excess. Specific hormone-secreting tumours of the adrenal gland include phaeochromocytomas with the potential for a catecholamine crisis, hyperaldosteronism resulting in Conn's Syndrome and hypercortisolism with resultant Cushing's Syndrome. Whilst, a detailed review of anaesthetic consideration is beyond the scope of these guidelines, the following pathophysiological issues need to be addressed in the perioperative setting:

3.4.1. Phaeochromocytoma:

The optimal timing of and suitability for anaesthesia is dependent on adequate sympatholytic therapy, specifically alpha-blockade initially and super-imposed beta-blockade in the setting of fluid resuscitation.

Many patients do not need beta blockade as the fluid replacement in combination with alpha blockade reduces reflex tachycardia and beta blockade should be held in reserve for those with cardiomyopathy or cardiac arrhythmia as full adrenoceptor blockade with alpha and beta blockade often complicates post operative hypotension.

Phenoxybenzamine has a long-established history as preoperative therapy. Whilst, its non-competitive binding to alpha-1-adrenoreceptors has the desired peripheral sympatholytic effect, its non-selectivity results in blockade of presynaptic alpha-2-adrenoreceptors, inhibition of the feedback loop regulating the release of noradrenaline in presynaptic nerve endings and a resultant tachycardia. This may be detrimental in the setting of cardiomyopathy. At this point in the management, the cautious introduction of a beta-adrenergic blockade is advised. The non-reversibility of the blockade due to phenoxybenzamine may result in negative effects in the postoperative period, including prolonged drowsiness and hypotension. This has resulted in the increased use of selective competitive alpha-1- adrenoceptor blockers

such as doxazosin. Unlike phenoxybenzamine, doxazosin does not cross the blood-brain barrier and has minimal sympathomimetic effects on intrinsic noradrenaline, thus less likely to induce a tachycardia. There is good evidence of the superiority of phenoxybenzamine to doxazosin (Buitenwerf et al)¹.

Approximately 30% of patients with phaeochromocytomas will present with left ventricular dysfunction due to catecholamine-induced cardiomyopathy⁽¹⁾, so a recent echocardiogram should be reviewed prior to induction of anaesthesia. The peri-operative setting to include induction of anaesthesia and surgery accounts for over 50% of pheochromocytomas related deaths. The goal of the anesthesiologist is, therefore, to minimise physiological stressors and avoid histamine-releasing pharmacological agents. Following discussion with the specialist surgeon regarding the requirement for neuroaxial anaesthesia, induction of general anaesthesia with endotracheal intubation should be facilitated with pharmacological agents devoid of histamine-releasing effects. Examples of medications that should be avoided include morphine, ketamine and atracurium. Knowledge of the primary catecholamine being secreted by the tumour may be useful in deciding the pharmacological responses to a catecholamine surge. Catecholamine surges caused by primary noradrenaline secreting tumours may respond best to a pure alpha-sympatholytic such as intravenous phentolamine, where adrenaline secreting tumour may respond best to a mixed alpha and beta-sympatholytic such as intravenous labetalol. Finally, time points in the peri-operative setting that require heightened attention include endotracheal intubation, positioning, surgical incision and manipulation.

3.4.2. Conn's Syndrome:

Primary hyperaldosteronism results from uninhibited secretion of aldosterone from either hyperplastic adrenal glands, mineralocorticoid-secreting granulomas or rarely cancers. Clinical sequelae that the caring anaesthesiologist needs to be aware of include hypokalaemia, hypomagnesaemia, alkalosis, muscle weakness, fluid retention and refractory hypertension. Chronic hypokalaemia may result in cardiomyopathy and a review of a recent echocardiogram is advised. There is the potential of increased sensitivity to neuromuscular blocking agents in the presence of symptomatic muscle weakness. Patient's with hyperaldosteronism may have a propensity to insulin resistance and hyperglycaemia. The goals of preoperative management are:

- (i) control of hypertension,
- (ii) optimization of cardiac function,
- (iii) restoration of the intravascular fluid status and
- (iv) correction of acid-base and electrolyte abnormalities.

Preoperative blood pressure control may be enhanced by the use of an aldosterone antagonist such as spironolactone. With spironolactone there is a high risk of postoperative hyperkalaemia (Fischer et al)².

3.4.3. Cushing's Syndrome from an Adrenal Source

Chronic hypercortisolism may result in clinical complexities that include obesity, a difficult airway, hyperglycaemia, cardiovascular comorbidities and osteoporosis to name but a few. As result, the provision of anaesthesia for the resection of a cortisol secreting tumour carries an undeniably high perioperative mortality risk. Similar to other functioning adrenal tumours, preoperative optimisation is key to a successful outcome. Anaesthesia considerations include but are not limited to thorough cardiac workup to include echocardiography and blood pressure control, assessment of and plan to deal with an anticipated difficult airway and blood glucose control during the perioperative period.

3.5. SUPPORT AND FOLLOW-UP

Postoperative endocrinological follow up may be undertaken at the centre undertaking surgery in the first instance and continued with local follow-up according to guidelines and local arrangements. Patients should be fully supported by the appropriate Endocrine CNS for their follow up visits.

Some patients may require long term steroid therapy following surgery, while some will warrant a clinical genetics review/ genetic testing depending on the underlying pathology. In addition, some patients may require further referral to radiation oncology or medical oncology.

4. VOLUME-OUTCOME RELATIONSHIP IN ADRENAL SURGERY

The relationship between operative volume and patient outcomes has been established for many complex surgical procedures including oncologic operations. Recent studies on adrenalectomy reveal a robust association between higher surgeon volume and improved patient outcomes.

The relationship between surgical volume and patient mortality was first evaluated by Lee et al., in 1957, who reported higher case-fatality rates among patients undergoing procedures for appendicitis, perforated peptic ulcer disease, and prostatic hypertrophy [1]. In the past 25 years, there has been mounting evidence that patients undergoing diverse surgical procedures have better outcomes, on average, if care is provided by high volume providers. Operations for which high surgical volume has been shown to be associated with improved patient outcomes include thyroidectomy, gastrectomy, colectomy, lung procedures, pancreaticoduodenectomy, and a variety of vascular procedures [2-10].

Statistical analyses have demonstrated that outcomes are improved when surgeons perform at least six adrenalectomies annually; based on this threshold definition of a 'high-volume surgeon', more than 80% of adrenalectomies in the United States are performed by 'low-volume surgeons'. When compared to low volume surgeons, high-volume surgeons on average achieve lower rates of postoperative complications and mortality, as well as a shorter length of hospital stay, and lower cost of hospitalization. There does not appear to be a similar association between hospital adrenalectomy volume and improved patient outcomes; however, there is evidence of benefit for the subset of patients with adrenocortical carcinoma. Despite the limitations of existing literature, evidence is sufficient to recommend the referral of patients with adrenal tumours to high-volume surgeons.

Recent studies have attempted to examine the association between surgeon and/or hospital volume and patient outcomes following adrenal surgery. The following table lists the major studies published since 2007.

Table 1: association between surgeon and/or hospital volume and patient outcomes following adrenal surgery

Author	Year	Database	N	Definitions	Findings
Stavrakis	2007	NY, FL All endocrine		Group A: N=1-3 cases/year Group B: N=4-8 cases/year Group C: N=9-19 cases/year Group D: N=20-50 cases/year Group E: N=51-99 cases/year Group F: >100 cases/year	No association with complications Decrease LOS
Gallagher	2007	FL 1998-2005	1816	4 quartile groups 1, 2, 3-6, >7	No association with complications Decreased LOS
Park	2009	HCUP Nationwide US 1999-2005	3144	Quartile analysis for Surgeon ≥ 4, Hospital ≥ 14	HV Surgeons ↓Morbidity, LOS HV Hospitals ↓LOS
Hauch	2016	US NIS 2013-2014	7829	Quartile analysis HV Surgeon >5 cases/year HV Hospital 18+cases/year	HV Surgeons ↓ Morbidity ↓ LOS, Costs
Palazzo	2016	UK HES, NHS 2013-2014	795 222 Surg	HV Surgeon ≥ 6 cases/year 36 surgeons (16%) 186 surgeons (84%) <2 cases/year Median = 1 case/year	LOS and re-admits ↑ LV Surgeons
Anderson	2018	US HCUP-NIS 1998-2009	6712 3496 Surg	Median = 1 case/year HV ≥ 6 cases/year LV < 6 cases/year	LV Surgeons ↑ Morbidity ↑ LOS, Costs
Lindeman	2018	NYS SPARCS 2000-2014	6054	Median = 1 case/year HV ≥ 4 cases/year (Endo Sx, US, Gen Sx)	HV Surgeons ↓Morbidity ↓ Costs
Caiazzo	2019	France 2012-2017 PMSI DB AFCE Study	9820	HV Centers = 32 cases/year 280 Centers < 5 cases over 6 years	HV Centres ↓ Mortality
Gray	2021	UK HES England GRIFT Programme 2013-2018	4189	Minimum volume = 6 cases/year In 2018 minimum volume achieved by 36% of surgeons 50% of Trusts	HV Surgeons ↓ re-admission Open Surgery only ↓ Mortality ↓ ICU admits

Wang and Duh³ highlighted in response to the Anderson and Lindeman findings that “ the multidisciplinary aspect of the pre-and post-operative management is critical, and it is likely that higher volume surgeons may be more attuned to clinical pathways and algorithms, such that improved patient outcomes are not a reflection only of technical ability but of a team-based approach to patient care.”

This is exemplified by the Dutch approach, who in 2004 created the Dutch Adrenal Network (DAN) in the Maxima Medical Centre (MMC) in Eindhoven. This consisted of the MMC and eight other University Medical Centres. This was initially focused on Adreno Cortical Carcinoma (ACC) but was expanded into the Netherlands Adrenal Gland Network (Bijniernet.nl). DAN facilitates trial participation, facilitates research, organises expert meetings and collaborates in guideline development with organisations such as ESES and ENSAT.

ESES published a consensus statement regarding volume-outcome in adrenal surgery in Langenbeck’s Archives of Surgery 2019 4. The main recommendations were that adrenal surgery should continue only in centres performing at least 6 cases per year and surgery for adrenocortical cancer should be restricted to centres performing at least 12 adrenal operations per year with an integrated multi-disciplinary team.

In terms of the Republic of Ireland, the quality of HIPE and NEQAIS database nationally is generally poor in relation to Adrenal surgery.

5. QUALITY IMPROVEMENT IN ADRENAL CARE

5.1. ADRENAL CARE NETWORK

The Dutch experience provides a template to rationalise the surgical care pathway for patients with benign and malignant diseases of the Adrenal gland in Ireland. A potential would be to create the Irish Adrenal Network (IAN). This would be inclusive rather than exclusive. But each centre would need to have a sufficient overall and surgical volume of adrenal cases.

The aim of any network is not to concentrate all resources in a single location, but to encourage hospitals to work together to balance workload, provide timely and appropriate care (especially emergency care) and ensure patients are treated by teams with greater experience in their condition.

We have seen in other specialities, as well as endocrinology, the positive impact a network can have in providing timely and equitable care. By studying existing methods of working, we can better understand the framework on how networks can be developed. We understand what key elements make them successful. These include:

- an enthusiastic lead who engages and has the respect of colleagues in the proposed network;
- administrative support to enable cross-site meetings;
- data-sharing agreements across trusts that are actively managed;
- technical support that can flexibly span the entire network.
- accessible and transparent referral pathways for complex cases

Perhaps the most crucial is an understanding that it is not just about centralising services but rather being flexible to adapt services where there is a need.

To reduce variation and ensure consistent provision of care and in turn outcomes, hospitals should collaborate to produce agreed local guidance and protocols for managing conditions. By providing care in line with agreed local guidance hospitals can ensure that care is equitable as well as effective. Cross-site working, such as MDTs, can be streamlined by adhering to set criteria when addressing each patient case.

There is no 'one size fits all' solution for integrated and collaborative working. We encourage hospitals to continue working with relevant stakeholders to identify core criteria for a network. Hospitals will no doubt benefit through reduced variation and improved patient flow, allowing treatment targets to be achieved within the designated timeframes. It is important to ensure new services will be sustainable with respect to quality and best practice

Pathways for HPB surgery and clinical genetics would be developed.

The IAN should coordinate data collection, facilitate research and organise meetings (possibly at the Irish Endocrine Society and either at the RCSI Millin or Charter meeting).

It should also develop links with other European organisations with an interest in Adrenal Diseases (ESES, BAETS, ENSAT, Bijniernet and the Society for Endocrinology in the UK) and join the grouping Adrenal.eu where patients, healthcare practitioners and informal carers have the opportunity to meet up (in the virtual sense) and share their experience, knowledge and ideas about the care for patients with adrenal gland disorders.

5.2. ADRENAL MULTI-DISCIPLINARY TEAM

An adrenal specific MDT would be an absolute requirement, either standalone or as a defined component of an endocrine / Neuro-Endocrine Tumour <NET> MDT, for any centre performing adrenal surgery.

The specific expertise at MDT should include:

5.2.1. Essential Members:

- Adrenal Surgeon (and access to hepatobiliary surgery for pre-agreed cases)
- Endocrinologist
- Radiology (radiologist with a specialist interest in adrenal imaging, an interventional radiologist with experience in adrenal vein sampling and access to Nuclear medicine imaging)
- Pathologist
- Chemical Pathologist/ Clinical Biochemist
- Anaesthetist and or Intensivist

5.2.2. Extra specialties who will be required for certain cases (mainly ACC and PPGL):

- Radiation Oncology
- Medical Oncology
- Access to Medical Genetics

Access and pathways to HSE Treatment Abroad Scheme for overseas treatment

5.2.3. Radiology Assessment:

- Imaging including non-contrast CT adrenal for Hounsfield unit assessment in order to risk stratify and contrast washout studies
- MRI in/ out phase
- Access to nuclear imaging (including 18F-glucose PET, MIBG, Octreotide and Ga DOTATATE imaging)
- Access to an interventional radiologist with experience in Adrenal vein Sampling

Access to adrenal steroid metabolomics (LC/MS or GC/MS) in certain cases

5.3. CLINICAL TRIALS AND AUDITS

Participation in adrenal clinical trials and audits would be instrumental to improving overall service delivery.

6. RECOMMENDATIONS

- 6.1.** Centres undertaking adrenal surgery should offer seamless, timely and expert care from presentation to diagnosis and management of adrenal tumours with all core members of the multidisciplinary team
- 6.2.** Most adrenal disease is benign, but functioning endocrine syndromes are complex and require high levels of expertise for management. Therefore, early referral and diagnostic work up to a centre with a dedicated adrenal MDT is in the best interests of patients to allow the timely management with appropriate investigations and interpretation by the core MDT members
- 6.3.** Adrenal surgery should continue in high volume centres. Adrenal surgical operations should be performed by surgeons that perform a minimum of 6 adrenalectomies a year; 12 per year per centre where adrenocortical cancers are being performed. This is to be seen as a baseline rather than a target.
- 6.4.** There should be regular and at least fortnightly endocrine/adrenal MDT in the centre, Urgent cases if required are presented in the Endocrine MDT if waiting for the specific MDT is a problem
- 6.5.** There should be access to endocrine physicians & medical oncologists on site
- 6.6.** In complex cases, there should be access to HPB and Vascular surgery
- 6.7.** Participation in adrenal clinical trials and audits should be mandatory to improve service delivery
- 6.8.** Adrenal endocrine functional workup should be standardised across all centres
- 6.9.** All patients undergoing surgery should be managed by an anaesthetist expert in the management of patients with adrenal disease. Early anaesthetic involvement is recommended especially in functioning tumours.
- 6.10.** Adrenal surgical services should have perioperative protocols for the pre-and post-operative management of pheochromocytoma patients where necessary including ICU/ HDU provision. Postoperative endocrine follow up may be undertaken at the centre undertaking surgery in the first instance and continued with local follow-up
- 6.11.** Establishment of Irish Adrenal Network (IAN) to coordinate data collection, facilitate research, organise meetings and develop international links with similar European and worldwide organizations

7. APPENDIX A: SLWG TERMS OF REFERENCE

SHORT LIFE WORKING GROUP ON BEST PRACTICE IN ADRENAL SURGERY MISSION / VISION

The aim of the SLWG is to provide recommendations to RCSI on best practices in Adrenal Surgery with a particular focus on endocrine adrenal surgery

Terms of Reference

- Undertake an international best practice review of the management of adrenal surgery and identify the elements that would be appropriate and feasible in an Irish context.
- Make recommendations on how the work-up before referral for adrenal surgery should be undertaken and, in particular, the constituents and role of the relevant multidisciplinary team.
- Evaluate the evidence relating to the relationship, if any, between surgical volume and patient outcomes and make recommendations on this matter prioritising the delivery of a safe, quality-assured service for patients.
- Identify the necessary perioperative protocols for the pre-, peri- and post-operative management of patients.
- Make recommendations on how patients should be jointly managed by the wider MDT

REPORTING RELATIONSHIPS

The Short Life Working Group (SLWG) will report directly to the Committee for Surgical Affairs

MEMBERSHIP

Chair:	Professor Paul Redmond
SLWG Secretary:	Mr Zeeshan Razzaq (Endocrine Surgeon, CUH)
RCSI:	Padraig Kelly
Independent Subject Matter Expert:	Ms. Susannah Shore (Endocrine Surgeon, Liverpool)

SUBJECT MATTER EXPERTS:

A. Galway:

1. Professor Aoife Lowery (Endocrine Surgeon)
2. Dr Michael Conall Dennedy (Endocrinologist)

B. Cork

1. Professor H. Paul Redmond (Chair & Endocrine Surgeon)
2. Dr. Barry Kelly (Consultant Anaesthetist)

C. SVUH, Dublin

1. Ms. Ruth Prichard (Endocrine Surgeon)
2. Professor Kevin Conlon (Endocrine Surgeon)

D. Beaumont, Dublin

1. Professor Arnold Hill (Endocrine Surgeon)
2. Professor Mark Sherlock (Endocrinologist)

Additional subject matter experts can be co-opted onto the various work streams as necessary but will not be part of the core panel outlined above.

8. ACKNOWLEDGEMENTS

The Chair of the SLWG would like to thank all the members of this group for their time and commitment in pulling this important document together.

9. REFERENCES

1. Buitenwerf E, Osinga TE, Timmers HJLM, Lenders JWM, Feelders RA, Eekhoff EMW, Haak HR, Corssmit EPM, Bisschop PHLT, Valk GD, Veldman RG, Dullaart RPF, Links TP, Voogd MF, Wietasch GJKG, Kerstens MN. Efficacy of α -Blockers on Hemodynamic Control during Pheochromocytoma Resection: A Randomized Controlled Trial. *J Clin Endocrinol Metab.* 2020 Jul 1;105(7):2381–91. doi: 10.1210/clinem/dgz188. PMID: 31714582; PMCID: PMC7261201.
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VERSION CONTROL LOG

Version	Date	Description of Change	Changed By
002	01 st of October 2021	Updates	PK
003	06 th of October 2021	Updates from MS	PK
004	09 th of October	Update from PR	PK
005	13 th of December	Update from MK	PK
006	14 th of December	Update from AL	PK
007	13 th of December	Update from KC	PK
008	23 rd of December	Formate updates PK	PK
009	4 th of January 2022	Final update from PR	ZR
010	5 th of January 2022	Final update from PR	PK



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