Wits biennial research day
School of Clinical Medicine

Overview of endocrine hypertension treated in surgery at Chris Hani Baragwanath Academic Hospital

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Background

- Hypertension is one the most common chronic conditions in medicine.
- Although hypertension of endocrine origin is uncommon (>5%), we believe it is under-reported especially in Sub-Saharan Africa.
- There is scarcity of publication in Sub-Saharan Africa.

1. Nel, D; Panieri, E; Malherbe, F; Steyn, R; Cairncross, L. Surgery for Pheochromocytoma: A single-Center review of 60 Cases from South Africa. World J Surg, 2020 vol.44 (6) pp. 1918-1924
2. Conradie W; Conradie M; Geldenhuys E; Edge J; Coetzee A; Lambrechts A. Retroperitoneoscopic adrenalectomy – introducing a new surgical technique in South Africa. S Afr J Surg. 2023;61:1-6. Online first https://doi.org/10.36303/SAJS.3836
3. Huddle, KR. Pheochromocytoma in black South Africans- a 30-year audit. S Afr Med J, vol. 101(3) pp.184-8

Background (cont'd)

- The potential cure after surgery, make endocrine hypertension a correctable disease, obviating the need for chronic anti-hypertensive medications in some cases.
- Early detection is likely to prevent irreversible structural damage to the kidney that will perpetuate the hypertension after successful surgery.
- When undiagnosed, hypertension will affect the target organs (heart, kidney, brain…) and can be the cause of sudden death.

Background (cont'd)

- The most common cause of endocrine hypertension is primary hyperaldosteronism.
- In this study, we reviewed all surgical procedures performed for endocrine hypertension at Chris Hani Baragwanath Academic Hospital (CHBAH) for 8 years (from 2013 to 2020) to reflect on the disease profile.

- The aim is to raise the awareness of endocrine hypertension and to reflect on the surgical management thereof.

Objectives

1. To establish the etiologies of endocrine hypertension at CHBAH

2. To determine the lead time to the diagnosis of endocrine hypertension

3. To list the surgical approaches used.

4. To determine the 30 days mortality

Methods

- Retrospective analysis of all surgical procedures performed for endocrine hypertension at CHBAH from January 2013 to December 2020. This is a descriptive observational study.
- Parameters analyzed include the demographics, the causes of endocrine hypertension, the location of the disease, the surgical approach, the histopathological report, the incidence of malignancy, the delay from the onset of hypertension to the diagnosis of endocrine etiology (lead time) and the 30 days post-operative mortality

Results

- **Demography**
- Male : 16 (34%), female: 31 (65.9%), M/F ratio: 1:2. Mean age:38 years (13-71 years). Race: Black: 45/47 (95.4%) .
- **Procedure**

Laparoscopy was possible in 46.8% (22/47) of all cases and in 73.3% (22/30) of eligible candidates

- **Diagnosis**
- Incidental diagnosis was made on 19.1% (9/47).
- 76.5% of cases were located in the adrenal gland and 23.4% extra-adrenal

Adrenal conditions diagnosed with complications: 8.5% (4/47)

Conditions	TIA	Catecholamine crisis	Profuse diarrhea
Pheochromocytoma	1	0	1 (composite pheochromocytoma)
Paraganglioma	1	1(isolated paraganglioma)	0
Total	2	1	1

Surgical approaches of the 47 cases

Approaches	Number (%)
Laparoscopy (trans-abdominal)	21 (44.6%)
Laparoscopy (retroperitoneal)	1 (2.1%)
Converted (subcostal)	7 (14.8%)
Converted (thoracotomy)	1 (2.1%)
Laparotomy (midline)	17 (36.1%)

Results (cont'd)

- **Lead time**
  - Pheochromocytoma: Mean lead time of 9.3 years (1-14 years).
  - Paraganglioma: mean lead time of 7.6 years (2-35 years).
  - Primary hyperaldosteronism: mean lead time of 12 years (7-20 years).
  - Cushing adenoma: mean lead time of 4.7 years (6 months-10 years)
- **Tumour size**
  - Hyperaldosteronism had smaller tumour (1.5- 3 cm).
  - Adrenocortical carcinoma had larger tumour (biggest diameter 150 mm)
  - Catecholamine-producing tumour (biggest diameter:50 to 200 mm).

Results (cont'd)

- **Bilateral tumours**
  - Two patients with pheochromocytoma had bilateral disease
  - One patient had three tumors (bilateral pheochromocytoma and an infrarenal paraganglioma along the right sympathetic chain)

Syndromes

- One case of pheochromocytoma was associated with hyperparathyroidism (adenoma) without the evidence of medullary thyroid carcinoma (?MEN 2)

Results (cont’d)

Catecholamine crisis

A female (34 years) with paraganglioma (2.1%) was diagnosed with catecholamine crisis that resulted in bilateral below knee amputation

Results: Etiologies of endocrine hypertension

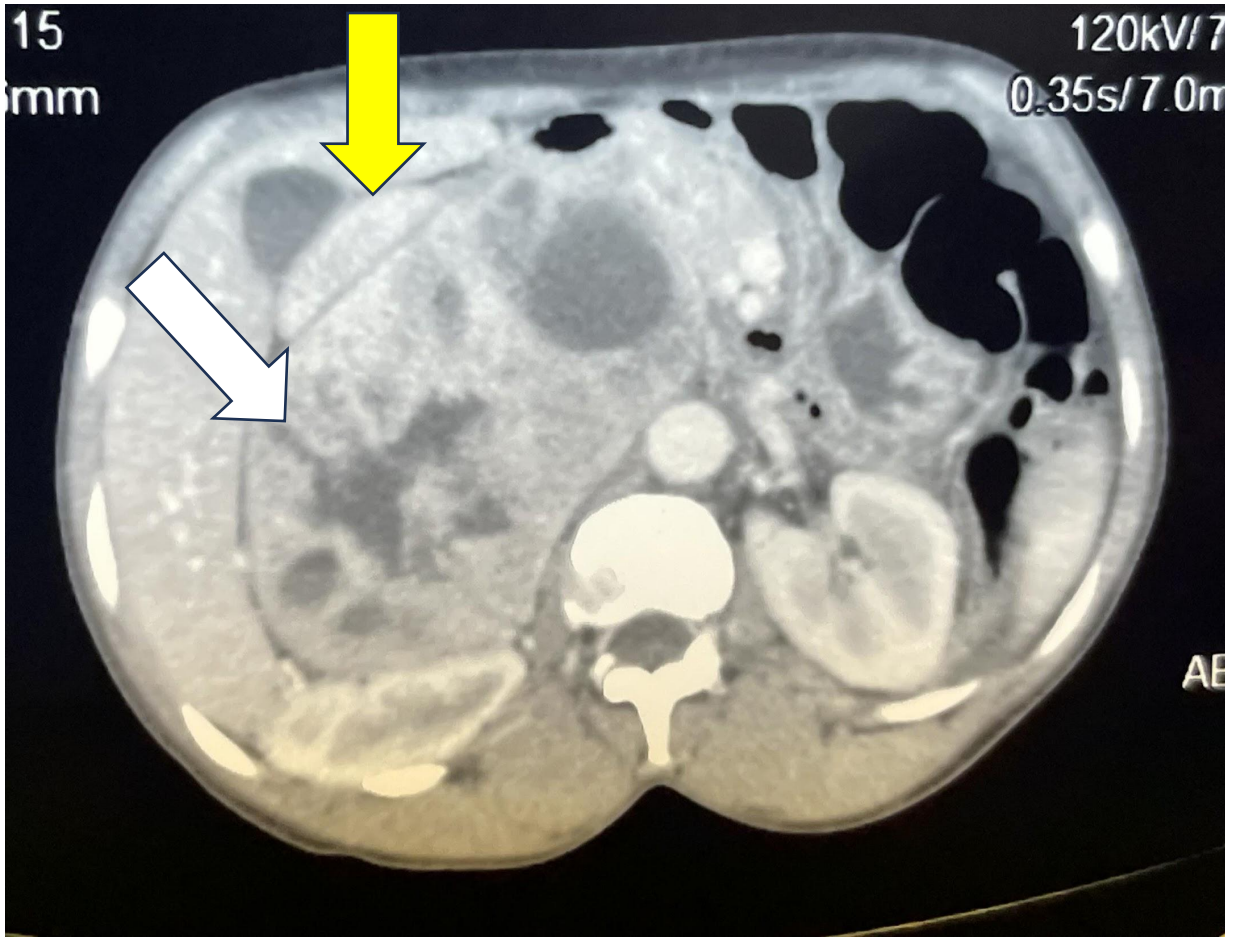
Etiology	Number	Laparoscopy	Open/converted/aborted procedure
Catecholamines producing tumours			
- Pheochromocytoma	17	7	6/4/0
- Paraganglioma	11	0	6/4/1
- Composite Pheochromocytoma	1	0	1/0/0
Hypercortisolism			
- Cushing adenoma	4	4	0/0/0
- PPNAD (bilateral)	1	1	0/0/0
- Cushing carcinoma	3	0	3/0/0
Hyperaldosteronism			
- Adrenocortical adenoma	7	7	0/0/0
Others			
- Benign mesothelial cyst	1	1	0/0/0
- Non secreting adenoma	2	2	0/0/0
Total	47	22	16/8/1

Results: Tumours location

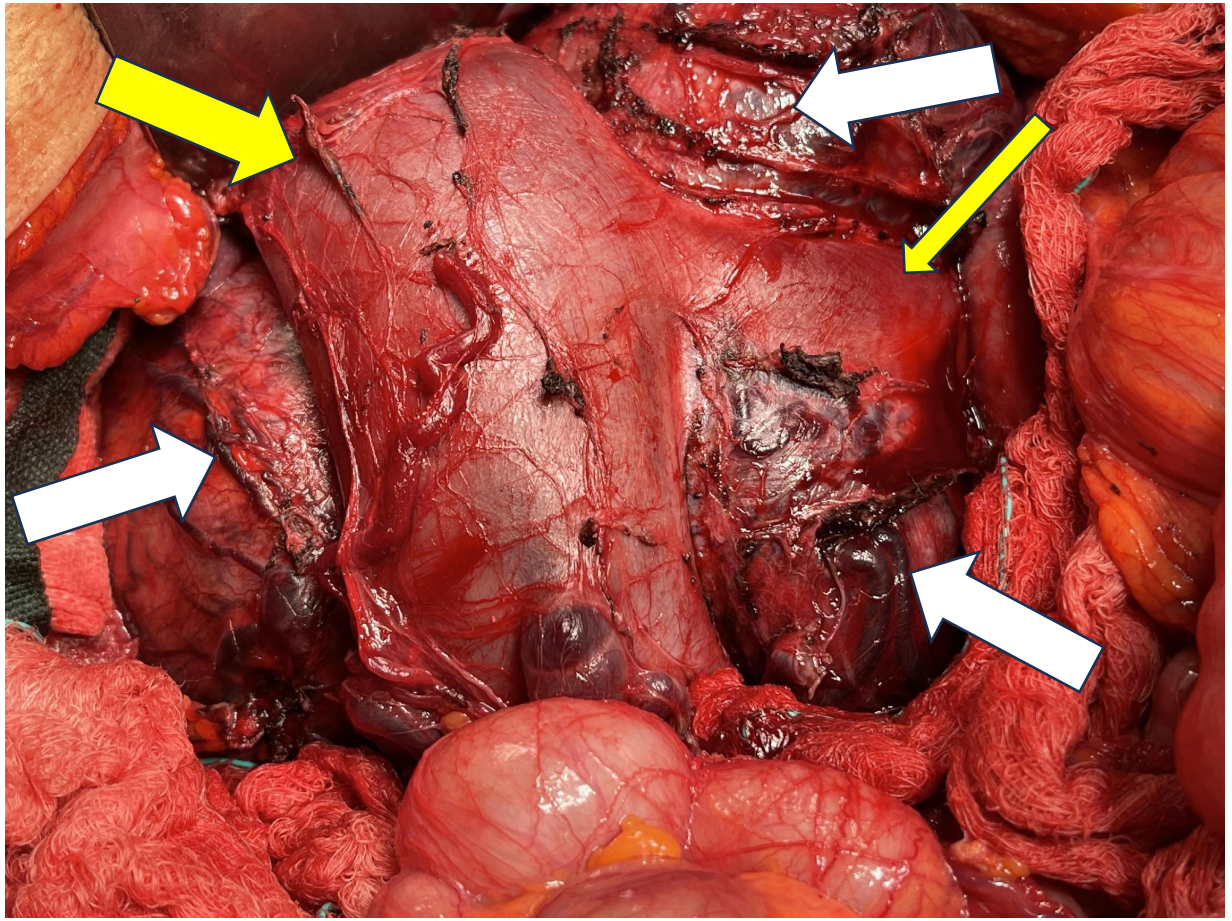
Conditions	Right	Left
Pheochromocytoma	10	10
Paraganglioma	4 abdominal sympathetic chain (except one intrathoracic)	7 (all abdominal sympathetic chain)
Adrenocortical adenoma (Cushing syndrome)	1	3
PPNAD (bilateral)	1	1
Cushing carcinoma	0	3
adrenocortical adenoma (Conn syndrome)	2	5
Non-secreting incidentaloma: - Benign mesothelial cyst - Adrenocortical adenoma	 0 2	 1 0
Total	21	30

An illustration of contraindication to laparoscopy: large paraganglioma on a 46 years old female

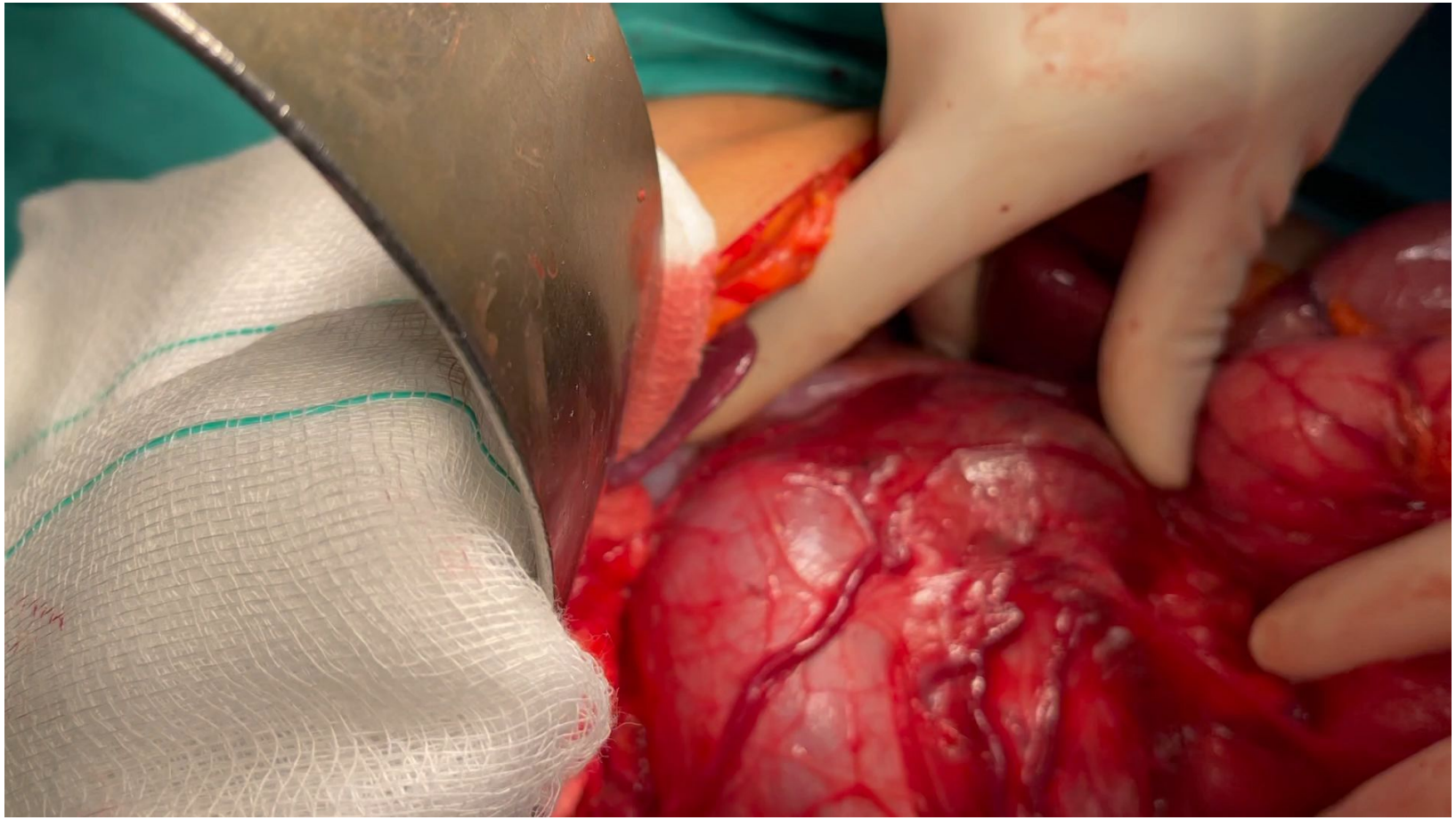
Ct scan abdomen: Large right paraganglioma



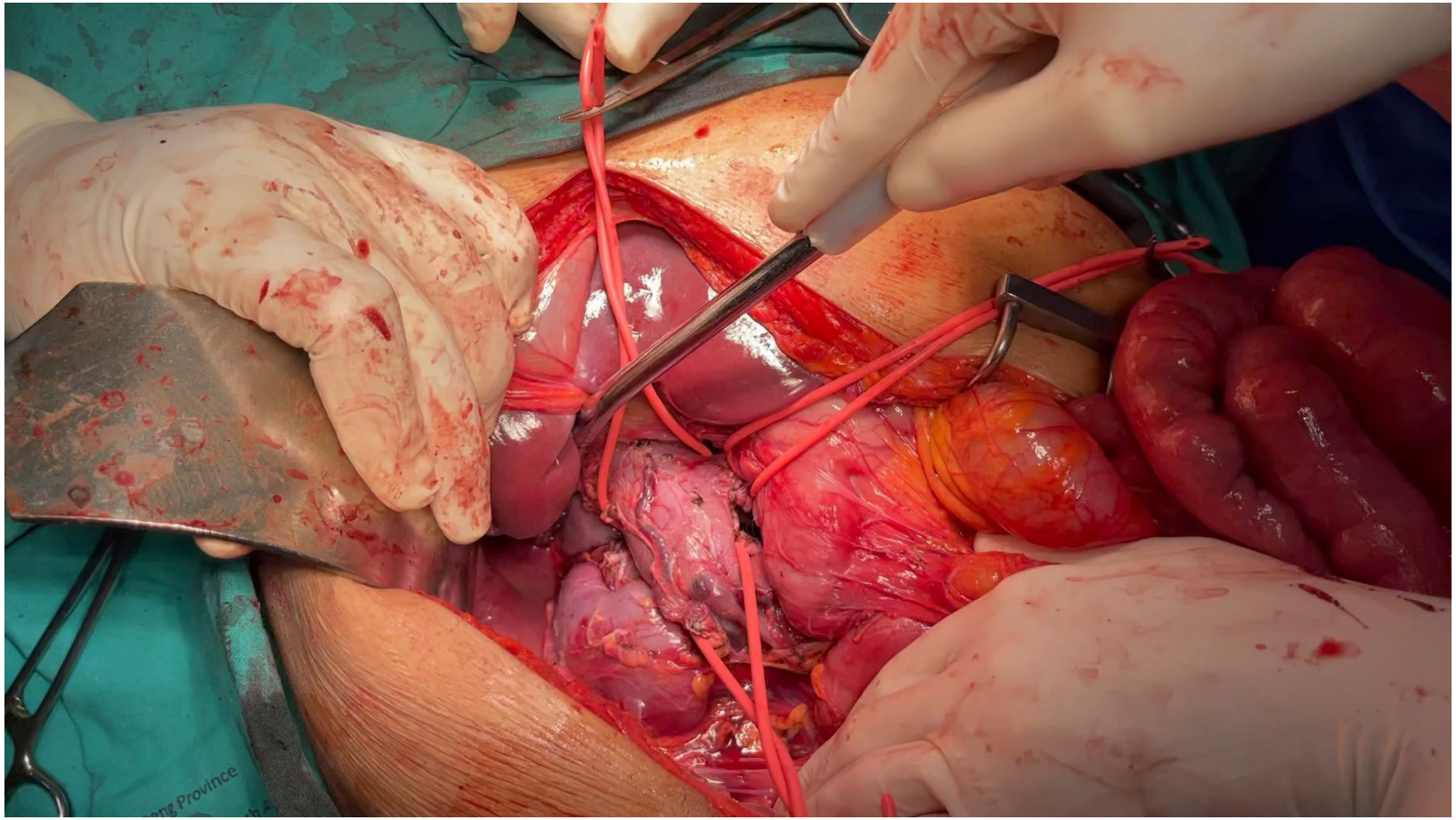
Large paraganglioma posterior to the IVC and both renal veins



Video paraganglioma and relationship with major vessels



Video post excision of paraganglioma



Conclusion

- The catecholamine-producing tumours were the most common (61.7%) endocrine pathology at our institution.
- There was significant delay to the diagnosis of endocrine hypertension in the catecholamine-producing tumours and in the primary hyperaldosteronism group.
- Minimal access surgery was achieved in nearly half of the patients (46.8%) and in three-quarter (73.3%) of the eligible candidates.
- Two of the three adrenocortical carcinoma were the only mortalities within 30 days.

Recommendation.

- We believe that selective screening needs to be enforced in all newly diagnosed hypertension, the young hypertensive patients and those on three or more anti-hypertensive agents.

- We also suggest that all incidental adrenal mass discovered on imaging be referred to the endocrinologist for work up.

THANKS