

Acromegaly in Basrah: Seventeen years of clinical experience at a tertiary endocrine centre

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Abstract

Background

Acromegaly is a rare multisystem disorder caused in most cases by a growth hormone–secreting pituitary adenoma. Data from Iraq remain limited, and long-term outcome data from tertiary endocrine practice are scarce.

Methods

This retrospective electronic database study included 236 patients with biochemically confirmed acromegaly managed at the Faiha Specialized Diabetes, Endocrine and Metabolism Center, Basrah, Iraq, between 5 February 2009 and 17 February 2026. Demographic, clinical, biochemical, radiological, treatment, and outcome data were reviewed.

Results

The mean age was 42.9 ± 13.4 years, and 53.4% were male. The mean body mass index was 30.3 ± 5.2 kg/m². Hypertension was present in 56.4%, diabetes mellitus in 45.3%, and hyperprolactinaemia in 11.4% of patients. Pituitary magnetic resonance imaging showed macroadenoma in 76.7%, microadenoma in 17.4%, and no visible adenoma in 5.9%. Overall, 136 patients (57.6%) underwent surgery, predominantly by the transsphenoidal approach, and 59 (25.0%) received radiotherapy. Final outcomes were remission in 56 patients (23.7%), active disease in 107 (45.3%), 64 (27.1%) lost to follow-up, and death in 10 (4.2%). In multivariable analysis, any surgery was independently associated with higher odds of remission (adjusted odds ratio 3.52, 95% confidence interval 1.39–8.88; $p = 0.008$), whereas radiotherapy was independently associated with lower odds of remission (adjusted odds ratio 0.43, 95% confidence interval 0.19–0.98; $p = 0.044$).

Conclusions

Acromegaly in Basrah was characterized by diagnosis in middle adulthood, a predominance of macroadenoma, substantial cardiometabolic comorbidity, and incomplete overall disease control. Surgery was the main factor associated with remission, whereas radiotherapy identified patients with more resistant disease. The relatively small number of registered cases over 17 years, despite the large Iraqi population, suggests likely under-diagnosis and delayed diagnosis. Earlier recognition, stronger referral pathways, and improved long-term follow-up are needed to optimize outcomes.

Introduction

Acromegaly is an uncommon disorder that is caused by a growth hormone-secreting pituitary adenoma in more than 95% of cases. Its reported prevalence was approximately 85 cases per million population in 2010, and this appears to be rising over time, likely due in part to improved detection and an increasing number of incidental diagnoses [1, 2].

Acromegaly is a multisystem disorder associated with an increased risk of metabolic and cardiovascular complications. If unrecognized or left untreated, it may lead to catastrophic consequences and markedly impair quality of life [3].

The onset of acromegaly is usually very slow, and confirmation requires biochemical diagnosis using age- and sex-specific insulin-like growth factor 1 (IGF-1) with suppressed growth hormone (GH) after an oral glucose tolerance test (OGTT) [1].

Disease control can be achieved by pituitary adenoma surgery in approximately half of cases, while the remaining patients require continued medical therapy and/or other treatment modalities [3].

Data on acromegaly in Iraq remain sparse and largely anecdotal, with the available literature originating mainly from single-centre studies in Basrah rather than from national, population-based registries [4]. In a Basrah pituitary registry, growth hormone-secreting adenomas were the most frequent pituitary adenoma subtype, accounting for 41.0% of pituitary adenomas, and 73.4% of acromegaly cases were macroadenomas [4]. A later Basrah study of 56 patients with acromegaly further characterized the clinical and biochemical profile of the disease in Southern Iraq [5]. A similar trend has been reported in neighbouring countries [6, 7]. The aim of the study was to explore the presentation behaviour and treatment of acromegaly in Basrah over a 17-year period (2009–2026).

Methods

This retrospective electronic database study was conducted at the Faiha Specialized Diabetes, Endocrine, and Metabolism Center (FDEMC), Basrah, Southern Iraq. A total of 236 patients were included over the study period extending from 5 February 2009 to 17 February 2026.

FDEMC is a tertiary referral centre that receives endocrine referrals from Basrah and other provinces of Iraq. The centre is staffed by experts in the management of endocrine disorders, including pituitary adenomas. For all registered patients, detailed clinical history, anthropometric measurements, comprehensive biochemical investigations, and hormonal assessment of pituitary function were routinely performed and recorded in the electronic database.

All patients registered at FDEMC with biochemically confirmed acromegaly were included in the study. Patients with incomplete data were excluded, including those with magnetic resonance imaging (MRI) evidence of a pituitary adenoma but without biochemical confirmation of acromegaly.

Data were retrieved from the FDEMC electronic database. Extracted variables included demographic characteristics, clinical history, anthropometric measurements, biochemical results, pituitary hormonal

profile, and imaging findings where available.

A detailed clinical history was obtained for all patients, together with anthropometric assessment and blood pressure measurement. Diabetes mellitus and hypertension were identified based on documented treatment or newly established diagnostic criteria. Diabetes mellitus was considered present in patients receiving antidiabetic medications or in those with a new biochemical diagnosis of diabetes. Hypertension was considered present in patients receiving antihypertensive medications or in those with blood pressure readings of $\geq 140/90$ mmHg on two separate occasions, measured after 5 minutes of rest.

From each patient 10 mL of blood was taken for chemical and hormonal analysis. Growth hormone and IGF-1 analysis were done using an electrochemiluminescence immunoassay using the Roche Cobas e411 analyser. Routine metabolic panels were performed for all patients. Cases were diagnosed as acromegaly when IGF-1 exceeded 1.3 times the age- and sex-specific upper limit of normal and GH failed to suppress during a 75-g OGTT, defined as a nadir > 1.0 ng/mL from 2014 onward and > 0.4 ng/mL since 2023 [3, 8]. A 75-g OGTT was performed for all patients in the fasting early-morning state [8]. All patients subsequently underwent 1.5-T gadolinium-enhanced pituitary MRI using the standard pituitary protocol [8].

Active disease and remission were defined according to Giustina *et al.* consensus [8]. 'Defaulter' status was applied to those who were lost to follow-up for at least 1 year. Ethical approval was obtained from the relevant institutional review board, and patient confidentiality was maintained throughout the study.

Continuous variables were summarized as mean $\pm$ standard deviation (SD) when approximately normally distributed and as median with interquartile range (IQR) when skewed, whereas categorical variables were reported as frequency and percentage. Group comparisons according to remission status were performed using the Mann–Whitney U test for skewed continuous variables and the Fisher exact test for categorical variables. Univariable and multivariable binary logistic regression models were used to estimate odds ratios (ORs) with 95% confidence intervals (CIs) for remission. The multivariable model included sex, age, hyperprolactinaemia, cavernous sinus invasion, any surgery, and radiotherapy. All tests were two-sided, and a p value < 0.05 was considered statistically significant. Odds ratios were not estimable in categories with zero remission events.

Results

Table 1 summarizes the baseline demographic, clinical, and radiological characteristics of the 236 patients included in the cohort. There was a slight male predominance (53.4%), and the mean age was 42.9 ± 13.4 years. The mean body mass index (BMI) was 30.3 ± 5.2 kg/m², indicating an overall overweight-to-obese cohort. Hypertension was present in 56.4%, diabetes mellitus in 45.3%, and hyperprolactinaemia in 11.4%. Follow-up duration and number of visits were highly variable, indicating marked heterogeneity in long-term monitoring. On pituitary MRI, macroadenoma was the dominant finding, whereas cavernous sinus invasion and chiasmal compression were less frequent.

Table 1
Baseline demographics, clinical, and radiological characteristics (n = 236).

Parameter	Value
Age (years)	42.88 ± 13.42
BMI (kg/m ²)	30.29 ± 5.18
Follow-up (months)	47.27 ± 53.06
Visits (number)	26.00 ± 37.35
Sex: Male	126 (53.4)
Sex: Female	110 (46.6)
BMI status: Underweight	3 (1.3)
BMI status: Normal BMI	29 (12.3)
BMI status: Overweight	86 (36.4)
BMI status: Obesity	118 (50.0)
Diabetes mellitus	107 (45.3)
Hypertension	133 (56.4)
Hyperprolactinaemia	27 (11.4)
MRI: Macroadenoma	181 (76.7)
MRI: Microadenoma	41 (17.4)
MRI: No adenoma	14 (5.9)
MRI: Cavernous sinus invasion	30 (12.7)
MRI: Chiasmal compression	22 (9.3)

A total of 136 patients (57.6%) underwent at least one surgical intervention (Table 2). Transsphenoidal surgery was the dominant approach and was performed in 131 patients, whereas transcranial surgery was used in a small minority. Radiotherapy was recorded in 59 patients (25.0%). More than half of the cohort were coded as receiving no medical treatment, while the remainder were treated with somatostatin receptor ligands (SRLs), cabergoline, or combined therapy. Active disease remained the most common outcome, followed by remission, defaulter status, and death. Cardiovascular disease accounted for most deaths.

At the last documented follow-up, 127 patients (53.8%) were not receiving ongoing medical therapy. This category included many patients who had undergone surgery and/or radiotherapy, as well as patients in

remission, defaulters, and deceased patients. The remaining patients were receiving SRLs, cabergoline, or combined therapy.

Table 2
Treatment modalities and outcomes.

Parameter	Value
Any surgery	136 (57.6)
Transssphenoidal surgery	131 (55.5)
Transcranial surgery	9 (3.8)
No surgery	100 (42.4)
One surgery	127 (53.8)
Two surgeries	8 (3.4)
Three surgeries	1 (0.4)
Radiotherapy	59 (25.0)
Medical treatment: No treatment*	127 (53.8)
Medical treatment: SRLs**	78 (33.1)
Medical treatment: Cabergoline	12 (5.1)
Medical treatment: SRLs + cabergoline	19 (8.1)
Final outcome: Remission	56 (23.7)
Final outcome: Active disease	107 (45.3)
Final outcome: Defaulter	64 (27.1)
Final outcome: Death	10 (4.2)
Cause of death: Cardiovascular disease	7
Cause of death: Osteosarcoma	1
Cause of death: Sickel cell disease	1
Cause of death: Pituitary gigantism / hypothalamic syndrome	1
*‘No treatment’ denotes no ongoing medical therapy at last recorded follow-up; it does not exclude prior surgery and/or radiotherapy.	
**SRLs denotes the somatostatin receptor ligands, octreotide long-acting release (LAR) or lanreotide autogel.	

Figure 1 shows the geographical distribution of the cohort by region. Basrah accounted for 120 patients (50.8%), followed by Thi Qar (17.4%), Muthanna (8.1%), and Maysan (7.2%). This pattern confirms that, although the centre mainly serves the local population, it also functions as a tertiary referral centre for other regions across Iraq.

Table 3 presents the yearly distribution of registration and surgical management from 2009 to 2026. Case registration was low in the earliest years and increased progressively over time, with the highest numbers recorded in 2023–2025. The proportion of patients undergoing surgery also increased in later years, driven largely by transsphenoidal procedures, whereas transcranial surgery remained uncommon throughout the study period.

Table 3
Year of registration and surgical intervention.

Year	Registered patients	Any surgery	Transsphenoidal surgery	Transcranial surgery
2009	2	0 (0.0%)	0 (0.0%)	0 (0.0%)
2010	8	3 (37.5%)	3 (37.5%)	0 (0.0%)
2011	3	2 (66.7%)	2 (66.7%)	0 (0.0%)
2012	4	1 (25.0%)	1 (25.0%)	0 (0.0%)
2013	15	11 (73.3%)	10 (66.7%)	2 (13.3%)
2014	8	4 (50.0%)	3 (37.5%)	1 (12.5%)
2015	8	5 (62.5%)	4 (50.0%)	2 (25.0%)
2016	8	5 (62.5%)	5 (62.5%)	0 (0.0%)
2017	17	11 (64.7%)	10 (58.8%)	1 (5.9%)
2018	20	10 (50.0%)	10 (50.0%)	0 (0.0%)
2019	21	9 (42.9%)	9 (42.9%)	0 (0.0%)
2020	9	4 (44.4%)	4 (44.4%)	0 (0.0%)
2021	16	10 (62.5%)	10 (62.5%)	1 (6.2%)
2022	21	11 (52.4%)	11 (52.4%)	0 (0.0%)
2023	23	11 (47.8%)	10 (43.5%)	1 (4.3%)
2024	24	18 (75.0%)	18 (75.0%)	0 (0.0%)
2025	27	21 (77.8%)	21 (77.8%)	1 (3.7%)
2026	2	0 (0.0%)	0 (0.0%)	0 (0.0%)

Figure 2 summarizes the referral pathways to the centre. Endocrinologists were the most common documented source of referral, accounting for 39.8% of cases. However, referral source was undocumented in nearly two-fifths of the cohort, which limits detailed interpretation of referral patterns. Among documented sources, specialist referral clearly predominated over self-referral and general-practitioner referral.

Table 4 combines the descriptive comparison by remission status with the crude odds ratios from univariable analysis. Number of visits was inversely associated with remission. Hyperprolactinaemia and cavernous sinus invasion were associated with lower odds of remission, whereas any surgery, a higher number of surgeries, and transsphenoidal surgery were associated with higher odds of remission. Radiotherapy and most baseline demographic variables were not significantly associated with remission in this combined table.

Table 4
Characteristics according to remission status and univariable association with remission.

Variable	No Remission (n = 180)	Remission (n = 56)	p-value	Unadjusted OR (95% CI)
Age, years	43.5 (32.8–54.0)	42.5 (32.0–52.0)	0.591	
BMI, kg/m ²	29.9 (26.7–33.2)	30.3 (27.2–33.5)	0.448	
Number of visits	27.47 ± 38.34	21.23 ± 33.94	0.040	0.99 (0.98–1.00)
Number of surgeries	0.0 (0.0–1.0)	1.0 (1.0–1.0)	< 0.001	
Male	96 (53.3%)	30 (53.6%)	0.549	0.99 (0.54–1.81)
Age ≥ 40 years	109 (60.6%)	31 (55.4%)	0.295	0.81 (0.44–1.48)
Age ≥ 50 years	64 (35.6%)	20 (35.7%)	0.552	1.01 (0.54–1.88)
Age ≥ 60 years	22 (12.2%)	3 (5.4%)	0.109	0.41 (0.12–1.41)
Hypertension	104 (57.8%)	29 (51.8%)	0.262	0.79 (0.43–1.43)
Diabetes mellitus	83 (46.1%)	24 (42.9%)	0.393	0.88 (0.48–1.61)
Hyperprolactinaemia	25 (13.9%)	2 (3.6%)	0.023	0.23 (0.05–1)
Macroadenoma	138 (76.7%)	43 (76.8%)	0.571	1.01 (0.5–2.05)
Microadenoma	28 (15.6%)	13 (23.2%)	0.132	1.64 (0.78–3.44)
No adenoma	14 (7.8%)	0 (0.0%)	0.02	N/A
Primary empty sella	10 (5.6%)	0 (0.0%)	0.123	
Chiasmal compression	18 (10.0%)	4 (7.1%)	0.365	0.69 (0.22–2.14)
Cavernous sinus invasion	27 (15.0%)	3 (5.4%)	0.041	0.32 (0.09–1.1)
Any surgery	88 (48.9%)	48 (85.7%)	< 0.001	6.27 (2.81–14.01)
Transsphenoidal surgery	85 (47.2%)	46 (82.1%)	< 0.001	5.14 (2.44–10.82)
Transcranial surgery	7 (3.9%)	2 (3.6%)	0.637	0.92 (0.19–4.54)
Radiotherapy	48 (26.7%)	11 (19.6%)	0.19	0.67 (0.32–1.41)
Two surgeries	4 (2.2%)	4 (7.1%)	0.093	3.39 (0.82–14)
Note: Odds ratios were not estimable in categories with zero remission events. BMI, body mass index; OR, odds ratio.				

Variable	No Remission (n = 180)	Remission (n = 56)	p-value	Unadjusted OR (95% CI)
Three surgeries	1 (0.6%)	0 (0.0%)	0.763	N/A
Note: Odds ratios were not estimable in categories with zero remission events. BMI, body mass index; OR, odds ratio.				

Table 5 presents the multivariable logistic regression model for remission. After adjustment for sex, age, hyperprolactinaemia, cavernous sinus invasion, surgery, and radiotherapy, any surgery remained independently associated with higher odds of remission, whereas radiotherapy was independently associated with lower odds of remission. Hyperprolactinaemia and cavernous sinus invasion showed borderline inverse associations, while sex and age were not independently associated with remission.

Table 5
Multivariable logistic regression for remission.

Predictor	Adjusted OR (95% CI)	P value
Male sex	0.77 (0.38–1.57)	0.472
Age, per year	1.00 (0.97–1.03)	0.840
Hyperprolactinaemia	0.21 (0.04–1.02)	0.054
Cavernous sinus invasion	0.27 (0.07–1.03)	0.054
Any surgery	3.52 (1.39–8.88)	0.008
Radiotherapy	0.43 (0.19–0.98)	0.044

Table 6 compares the 163 evaluable patients with remission versus active disease after excluding defaulters and deaths. Most demographic and metabolic variables were similar between groups. Remission was associated mainly with a lower number of visits and a higher frequency of surgery, especially transsphenoidal surgery, whereas cavernous sinus invasion and radiotherapy were more common among patients with persistent active disease.

Table 6
Comparison of evaluable patients with remission versus active disease (n = 163).

Variable	Remission (n = 56)	Active disease (n = 107)	P value
Age, median (IQR), years	42.5 (32.0–52.0)	43.0 (32.5–53.5)	0.813
Body mass index, median (IQR), kg/m ²	30.3 (27.2–33.5)	30.5 (27.5–33.6)	0.943
Year of diagnosis, median (IQR)	2022 (2016–2024)	2019 (2017–2022)	0.227
Duration of follow-up, median (IQR), months	15.0 (4.0–81.5)	42.0 (9.0–89.0)	0.126
Number of visits, median (IQR)	8.0 (4.8–15.8)	14.0 (5.0–55.5)	0.040
Male sex	30/56 (53.6%)	57/107 (53.3%)	1.000
Hypertension	29/56 (51.8%)	66/107 (61.7%)	0.294
Diabetes mellitus	24/56 (42.9%)	48/107 (44.9%)	0.937
Hyperprolactinemia	2/56 (3.6%)	15/107 (14.0%)	0.071
Microadenoma	13/56 (23.2%)	18/107 (16.8%)	
Macroadenoma	43/56 (76.8%)	85/107 (79.4%)	0.233
No adenoma	0/56 (0.0%)	4/107 (3.7%)	
Chiasmal compression	4/56 (7.1%)	14/107 (13.1%)	0.376
Cavernous sinus invasion	3/56 (5.4%)	19/107 (17.8%)	0.050
Any surgery	48/56 (85.7%)	71/107 (66.4%)	0.014
Transsphenoidal surgery	46/56 (82.1%)	70/107 (65.4%)	0.040
Transcranial surgery	2/56 (3.6%)	4/107 (3.7%)	1.000
Radiotherapy	11/56 (19.6%)	38/107 (35.5%)	0.055

IQR, interquartile range.

Discussion

In this 17-year tertiary-centre cohort from Basrah, acromegaly was characterized by diagnosis in middle adulthood, with a slight male predominance, a high frequency of macroadenoma, substantial cardiometabolic comorbidity, and incomplete overall disease control. Surgery, particularly the transsphenoidal approach, emerged as the main favourable determinant of remission, whereas cavernous sinus invasion and the need for radiotherapy identified patients with more resistant disease. Overall, these findings place the Basrah experience within the pattern reported from other regional

tertiary centres, while also emphasizing the burden of delayed presentation and incomplete long-term control in Iraq [4, 6].

The mean age at diagnosis in our cohort was 42.9 years, which is similar to several Middle Eastern cohorts, including reports from Iran, Saudi Arabia, and the United Arab Emirates (UAE) [6, 7, 9]. The slight male predominance in our study also resembles that reported in neighbouring regional series [6, 7]. This broad consistency suggests that the demographic profile of acromegaly in Basrah is generally comparable to other referral-based cohorts from the region, where most patients present as symptomatic adults rather than being detected very early through incidental diagnosis [6, 7, 9].

A major feature of our study was the predominance of macroadenoma, present in 76.7% of patients. This closely parallels the earlier Basrah pituitary registry, in which 73.4% of patients with acromegaly had macroadenoma [4]. It is also similar to the UAE cohort, where macroadenoma was reported in most patients [6]. Turkish single-centre data have shown similarly high macroadenoma rates [10]. Taken together, these findings strongly suggest that delayed recognition remains a major issue in the region, with many patients reaching specialist care only after tumour enlargement and the development of local invasiveness or systemic complications [6, 10, 11]. In our study, the numerically higher proportion of microadenoma in the remission group suggests that earlier diagnosis may facilitate identification of acromegaly at a smaller and less invasive stage, potentially improving biochemical outcomes and reducing the need for complex multimodal therapy, although our data do not support the conclusion that surgery can be reliably avoided. The absence of remission in the no-adenoma subgroup should be interpreted cautiously. This subgroup was small, and the term “no adenoma” reflects an imaging category rather than a biologic diagnosis. In acromegaly, small GH-secreting pituitary adenomas may remain occult on conventional MRI, particularly with standard imaging protocols [12, 13]. Negative pituitary imaging may also occur in the setting of pituitary flattening or empty sella [14]. Rarely, biochemical acromegaly with negative pituitary MRI may reflect ectopic growth hormone-releasing hormone or growth hormone secretion [15]. Accordingly, the zero-remission finding in this subgroup is more likely to reflect small sample size and diagnostic complexity than a definitive adverse prognostic phenotype [11–14].

The burden of metabolic and cardiovascular comorbidity in our cohort was substantial, with hypertension in 56.4% and diabetes mellitus in 45.3% of patients. The diabetes frequency was very similar to that reported in the UAE study [6]. Hypertension in our cohort appeared higher than in several neighbouring reports [6, 9]. This may reflect later presentation, higher adiposity burden, longer exposure to excess growth hormone, or differences in referral and diagnosis. Importantly, cardiovascular disease was the leading recorded cause of death in our series, which is consistent with recent reviews showing that cardiovascular complications remain a major driver of adverse outcomes in acromegaly [16].

The overall remission rate in our full registered cohort was 23.7%, while active disease remained the most frequent final status and more than one-quarter of patients defaulted from follow-up. This remission proportion is lower than the disease-control rate reported in the UAE series [6]. It is also lower

than that described in some Turkish surgical series [17]. However, it is close to the remission frequency reported in a Pakistani cohort [18]. These comparisons should be interpreted cautiously because study denominators differ: our figure reflects the whole registered cohort rather than only surgically treated or actively followed patients. Even so, the combination of modest remission and high loss to follow-up in our study strongly suggests that improving longitudinal retention and access to multimodal care could meaningfully improve outcomes in Basrah.

Our predictor analysis supports the central role of surgery in disease control. In the multivariable model, any surgery remained independently associated with remission, whereas radiotherapy was inversely associated with remission and cavernous sinus invasion showed a borderline negative association. These findings are biologically and clinically plausible. Surgical remission in acromegaly is strongly influenced by tumour invasiveness, especially cavernous sinus extension [19, 20]. Radiotherapy is usually reserved for persistent or refractory disease and therefore often marks a more difficult phenotype rather than causing poorer outcomes [12, 17]. The strong association between transsphenoidal surgery and remission in our cohort is therefore fully consistent with the wider literature on prognostic factors after pituitary surgery [19, 20].

Hyperprolactinaemia also showed an inverse association with remission in our cohort, although this became borderline after adjustment. This observation may reflect mixed somatotroph-lactotroph tumours, stalk effect, or larger and more invasive lesions rather than an isolated independent biologic effect [5, 19]. It is therefore best interpreted as a marker of more complex tumour behaviour rather than a definitive stand-alone predictor. The temporal increase in registrations and the wide geographic spread of referrals in our cohort further indicate that the FDEMC functions as a true tertiary referral centre for Southern Iraq and beyond. However, the persistently high macroadenoma burden despite increasing case capture suggests that diagnostic delay remains unresolved [4, 5]. Earlier recognition by primary care physicians, internists, ophthalmologists, neurologists, and neurosurgeons could reduce tumour size at diagnosis and potentially improve remission rates [11, 12].

The main strengths of our study are the long study period and relatively large sample for a rare disease, whereas the main limitations are its retrospective design, incomplete referral documentation, heterogeneous follow-up, and the large proportion lost to follow-up. Specifically, that it was a retrospective single-centre study conducted at a tertiary referral centre may limit its generalizability and may also underestimate the true burden of acromegaly in Basrah and Iraq. Given the large national population of Iraq, the registration of only 236 patients over 17 years almost certainly reflects under-diagnosis rather than the true frequency of disease. Follow-up duration was heterogeneous, referral source was undocumented in a large proportion of patients, and a substantial number of patients defaulted from follow-up, all of which may have affected the precision of outcome assessment. The retrospective database design also limited the availability of some potentially relevant variables, including uniform pathological characterization, changes in diagnostic thresholds over time, and standardized longitudinal assessment of treatment response. Comparisons with other regional studies

should be interpreted cautiously because remission definitions, denominators, and follow-up frameworks were not fully identical across cohorts.

Taken together, our findings provide a contemporary real-world picture of acromegaly care in Southern Iraq. The data support the need for earlier diagnosis, stronger long-term follow-up retention, wider multidisciplinary collaboration, and better access to surgery and adjuvant therapy. These priorities are aligned with modern consensus recommendations, which emphasize timely biochemical diagnosis, expert pituitary imaging, first-line transsphenoidal surgery when feasible, and individualized multimodal treatment for persistent disease [8, 12].

Conclusions

Acromegaly in Basrah remains a late-presenting disease with a predominance of macroadenoma and incomplete remission in many patients. Surgery was the strongest predictor of remission, whereas invasive tumour behaviour and radiotherapy were associated with poorer outcomes. Earlier diagnosis, better follow-up, and stronger multidisciplinary care are needed, while the small number of registered cases relative to Iraq's large population suggests ongoing under-diagnosis.

Abbreviations

BMI

body mass index

CI

confidence interval

FDEMC

Faiha Specialized Diabetes,Endocrine and Metabolism Center

GH

growth hormone

IGF-1

insulin-like growth factor 1

IQR

interquartile range

LAR

long-acting release

MRI

magnetic resonance imaging

OGTT

oral glucose tolerance test

OR

odds ratio

SD

standard deviation

SRL

somatostatin receptor ligand

TDEMC

Thi-Qar Specialized Diabetes,Endocrine and Metabolism Center.

Declarations

Ethics approval and consent to participate:

All procedures performed in this study were conducted in accordance with the 1964 Declaration of Helsinki and were reviewed and approved by the Ethical Committee of Faiha Specialized Diabetes, Endocrine and Metabolism Center (FDEMC), Basrah, Iraq, under reference number 56/35/22 on 18 July 2018. Informed written consent was obtained from all patients who agreed to participate.

Consent for publication:

Not applicable.

Competing interests:

The authors declare that they have no competing interests.

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Author Contribution

AAM was responsible for the study conception, design and implementation, as well as drafting the initial and final manuscripts. All listed authors were involved in data collection and review. All authors read and approved the final manuscript.

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Data Availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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Figures

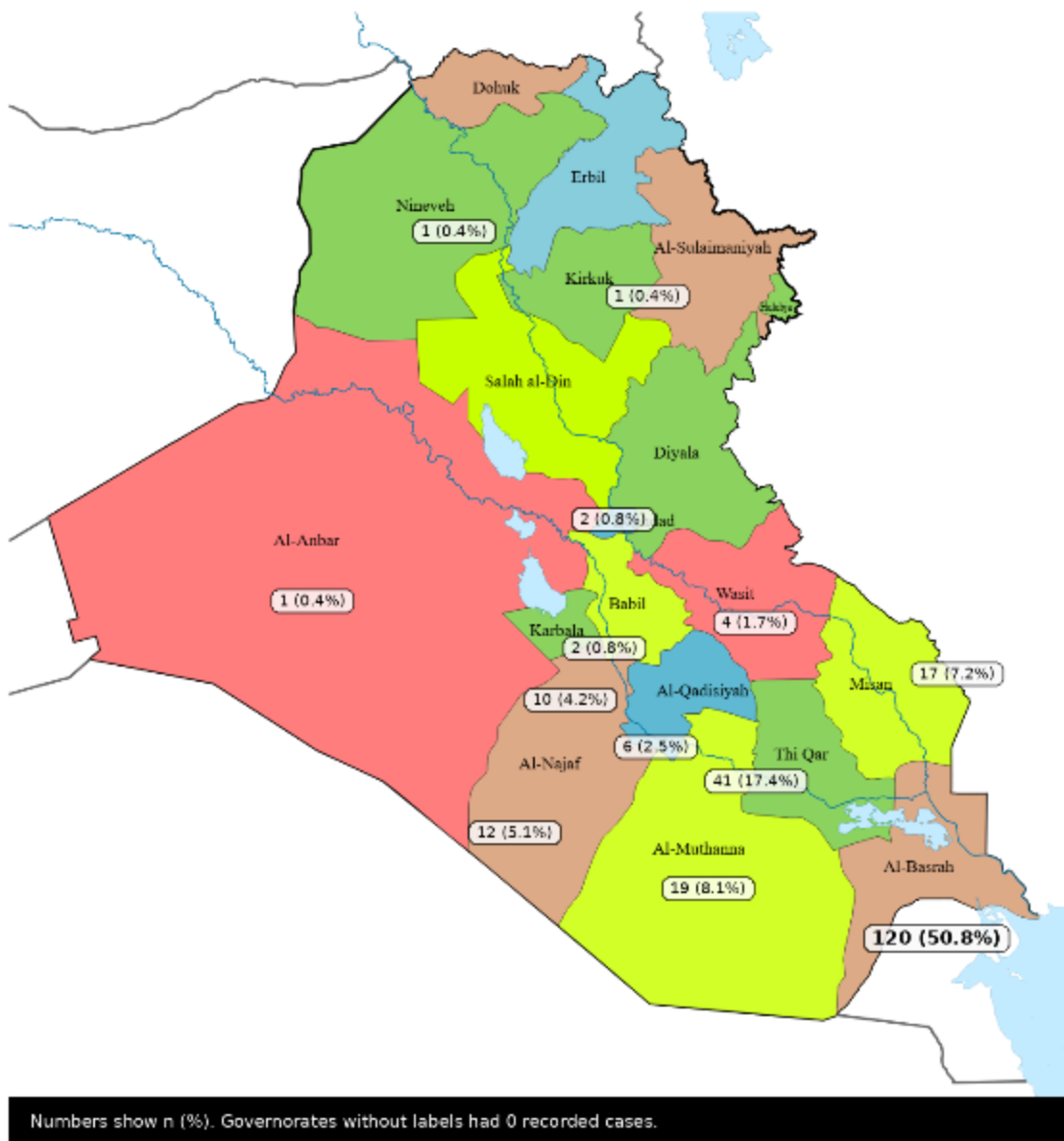


Figure 1

Geographical distribution by region.

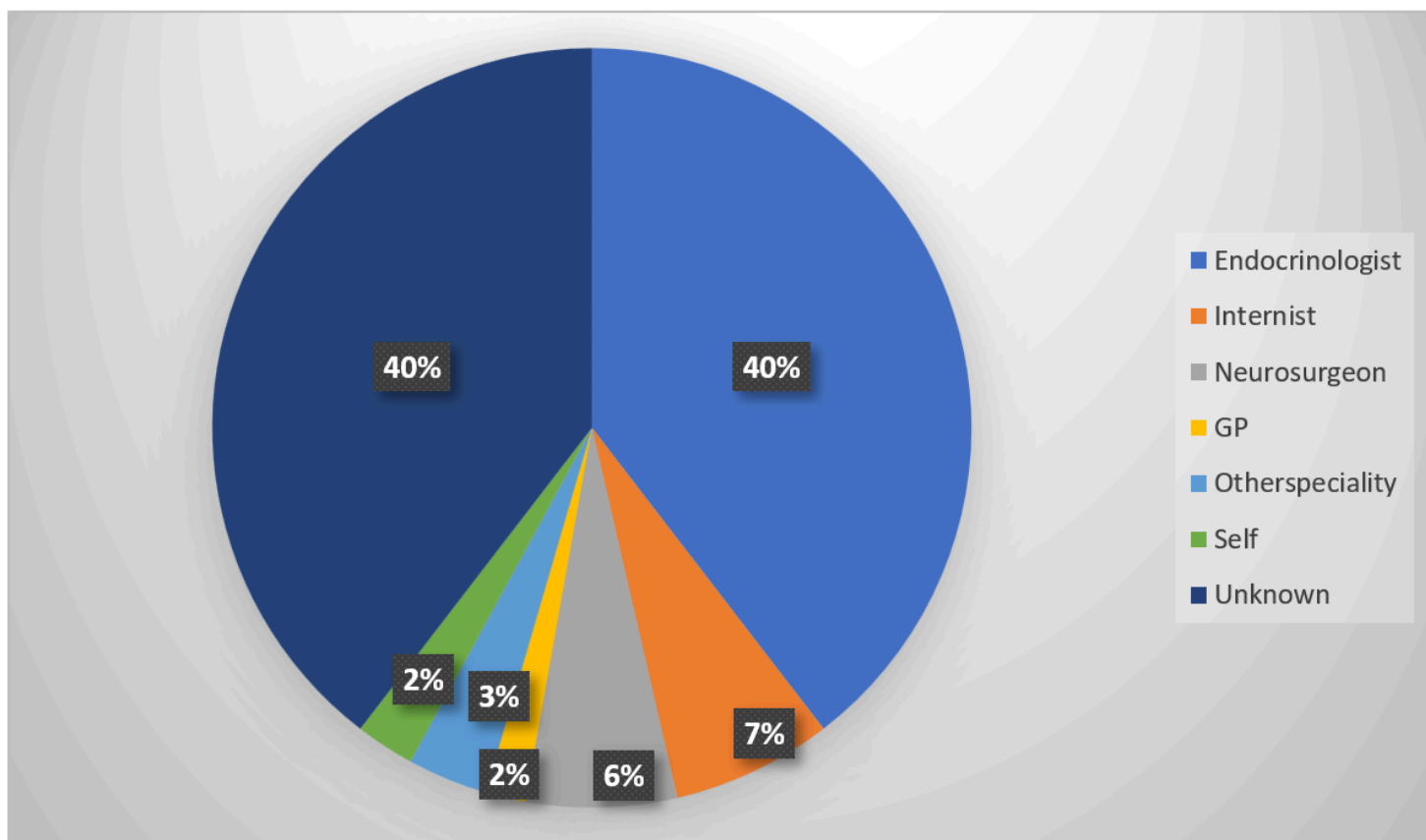


Figure 2

Referral sources of cases.