SCIENCE SET
OPEN ACCESS PUBLISHERS

Research Article

Science Set Journal of Economics Research

Study of Systemic Disorders Associated with Pituitary Tumors in Damascus Hospital

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Submitted: 20 Apr 2023 **Accepted:** 26 Apr 2023 **Published:** 30 Apr 2023

Citation: *Obaida Ezzat Thuloj, Mohammad Ahmad Alrawashdeh and Taghrid Hammoud (2023). Study of Systemic Disorders Associated with Pituitary Tumors in Damascus Hospital. Sci Set J of Economics 2(1),01-10.*

Abstract

Background: *Pituitary tumors are mostly benign masses and are rarely malignant. Pituitary tumors are either secretory or non-secretory tumors. Pituitary tumors are presented with a variety of symptoms based on the hormone that is secreted.*

Methods: *A cross-sectional study conducted in Damascus hospital containing 150 patients between the years 2012 and 2022 based on a specific inclusion and exclusion criteria.*

Results: *Results have shown a correlation between metabolic disorders and being female compared to males. In addition, gastrointestinal symptoms were noticeable in patients with a positive family history.*

Conclusion: *In this study patients with pituitary tumors presented with a variety of symptoms, which depicts the importance of having more studies done in the future regarding these conditions.*

Introduction

Most pituitary tumors are benign conditions and are rarely malignant. These tumors are divided into secretory and non-secretory tumors based on the tumor's capability of secreting hormones.

A study conducted in the UK showed a prevalence of 77.6 pituitary adenoma cases out of 100000 people. Those were further divided into Prolactinomas (44.6), nonfunctioning PAs (22.2). no correlation was found between age and sex and prevalence and occurrence of pituitary adenomas [1, 2].

Clinical presentation of pituitary neoplasms differs based on size and location of the tumor and based whether the adenoma is secreting or non-secreting [3].

Adenomas are classified anatomically or radiologically to Macroadenomas (>1cm) and Microadenomas (<1cm) [3].

Neurological symptoms include headaches, Parinaud's phenomenon and pituitary ischemia [4].

Adenomas that enlarge may cause compression of the optic chiasm which cause a number of vision impairments such as hemianopia and diplopia [4].

Clinical presentation of secreting adenomas is varied and differs based on the type of the hormone secreted.

Prolactinomas cause Galactorrhea and Amenorrhea in females and erectile dysfunction in males.

ACTH-secreting tumors causes cushing disease. GH-secreting tumors cause acromegaly.

Pituitary tumors can be treated either medically, surgically or with radiation therapy based on the signs and symptoms and causations [5, 6].

Medication is used in secreting adenomas. Prolactinomas respond to Dopamine agonists and are the first line in treating prolactinomas.

Methods

Study Population

A cross-sectional study was done in Damascus Hospital. 150 patients were included and all information regarding their demographic data, length of stay. Diagnosis and in- hospital procedures were obtained from the database of the endocrinology department.

Statistical Analysis

The data was assembled using MS Excel, and it was then exam-

ined using SPSS 20.0. The mean and standard deviation were used as the descriptive statistics for quantitative variables, and frequencies and percentages were used for qualitative data. In order to create hypotheses, relationships between variables were examined using the correlation or unpaired t-test for quantitative data and the Chi-square test for qualitative variables.

Results

Descriptive Analysis

Starting with demographic data of the individuals, two thirds of the sample were females (66%) and the rest were males (34%).

Table (1)

sex					
		frequency	percent	Valid percent	Cumulative percent
	male	66	44.0	44.0	44.0
	female	84	56.0	56.0	100.0
	total	150	100.0	100.0	

Mean age of the studied sample was 42, oldest individual was 74, youngest was 8 and most recurrent age was 50.

Table (2)

statistics		
age		
N	Valid	150
	Missing	0
Mean	42.00	
Median	41.00	
mode	50.00	
Std. deviation	14.7007	
Variance	216.295	
Minimum	8	
Maximum	74	
Percentiles	25	30.75
	50	41.00
	75	52.25

BMI values of the patients were between 16 and 35. Mean value was 25.

Table (3)

Statistics		
BMI		
N	Valid	150
	Missing	0
Mean	24.569	
Median	24.000	
mode	24.0	
Std. deviation	3.7179	
Minimum	16.0	
Maximum	35.0	

Moving on to the habits of the patients, nearly 65% of the patients were non-smokers while the rest of the sample were smokers (35%).

Table (4)

Smoking					
	frequency	**percent**	**Valid percent**	**Cumulative**	
percent					
	Yes	98	65.3	65.3	65.3
	No	52	44.7	44.7	100.0
	total	150	100.0	100.0	

Regarding co-morbidities, 56% of the patients did not have accompanying illnesses while the rest had different co-morbidities such as hypertension (21%) and diabetes (15%).

Table (5)

Medical history	**Number**	**Percentile**
No co-morbidities	84	56%
Hypertension	32	21%
Diabetes	22	15%
Diabetic foot	1	0.6%
Tachycardia	1	0.6%
Myocardial infarction	2	1.3%
Cardiac catheter	1	0.6%
Glaucoma	1	2%
Venous thrombosis	3	0.6%
Rheumatic fever	1	1.3%
Pneumonia	2	0.6%
UTIs	1	0.6%
Mental disabilities	1	0.6%
Cystectomy	1	0.6%
Urethral stenosis	1	0.6%
Kidney stones	1	0.6%
Kidney failure	1	0.6%
Kidney atrophy	2	1.3%
Peptic ulcer	2	1.3%
Hyperthyroidism	1	0.6%
Thyroid goiter	3	2%
Hypothyroidism	2	1.3%
Pituitary failure	1	0.6%
HIP	1	0.6%

As for the surgical history, nearly half of the individuals mentioned that they had no surgical procedure in the past. 16% said that they had pituitary surgery operated on them and 4% had done a caesarian section.

Table (6)

Surgical history	Number	Percentile
No surgical history	78	52%
Pituitary surgery	24	16%
Thyroidectomy	3	2%
Mastectomy	2	1.3%
Ovariectomy	1	0.6%
Ceasarean section	6	4%
Fibroidectomy	1	0.6%
Dilatation and Curettage	1	0.6%
Ectopic pregnancy	1	0.6%
Haemrrohiods	3	2%
Varicocele	5	3.3%
Prostatectomy	1	0.6%
	1	0.6%
Leg surgery	1	0.6%
Diabetic foot surgery	1	0.6%
Pilonidal fistula	1	0.6%
Cardiac stents	2	1.3%
Intraocular lens implant	1	0.6%
Pyloric stenosis	1	0.6%
Lithotripsy	1	0.6%
Urethral dilatation	1	0.6%
Nasal sinuses	1	0.6%
Rhinoplasty	1	0.6%
Disc herniation	3	2%
Appendectomy	5	3.3%
Inguinal hernia	7	5%
Diaphragmatic hernia	1	0.6%
Umbilical hernia	2	1.3%
Liposuction	1	0.6%
Tonsilectomy	4	2.6%
Cataract surgery	1	0.6%
Cardiac catheter	1	0.6%

Most patients from the sample suffered from neurological symptoms. The most common of these symptoms were vision-related problems (57%) and headaches (50%).

Table (7)

Neurological symptoms					
		frequency	percent	Valid percent	Cumulative percent
	Yes	138	92.0	92.0	92.0
	No	12	8	8	100.0
	total	150	100.0	100.0	

Neurological symptoms	Number	percentile
Headaches	75	50%
Seizures	8	5.3%
Depression and agitation	2	1.3%
Visual disturbances	86	57%
Facial parasthesia	12	8%
Drowsiness	21	14%
Vertigo	17	11%
Loss of consciousness		

Regarding metabolic disorders, 57% percent of patients from a wide variety of metabolic symptoms, 27% of which suffered from morbid obesity and 11% suffered from hyperglycemia.

Table (8)

Metabolic symptoms					
		frequency	percent	Valid percent	Cumulative percent
	Yes	85	56.7	56.7	56.7
	No	65	43.3	43.3	43.3
	total	150	100.0	100.0	

Metabolic problems	Number	Percentile
Hyperglycemia	17	11.3%
Hypoglycemia	2	1.3%
Morbid obesity	41	27.3%
Loss of weight	8	5.3%
Feeling cold	4	2.6%
Hyperhidrosis	3	2%

Relationship Between Variables

Using a P value of >0.05, there was a significant correlation between sex and occurrence of metabolic disturbances, with these disturbances being more common in females (54%) than in males (36%).

Table (9)

Crosstab				
Count				
		Does the patient suffer from a metabolic disorder?		Total
		No	Yes	
Sex	Male	46	20	66
	Female	39	45	84
Total	85	65	150	

Chi-Square Tests					
	Value	df	Asymptotic Significance (2- sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi- Square	8.149a	1	.004		
Continuity Correction$_b$	7.229	1	.007		
Likelihood Ratio	8.280	1	.004		
Fisher's Exact Test				.005	.003
Linear-by-Linear Association	8.095	1	.004		
N of Valid Cases	150				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 28.60.
b. Computed only for a 2x2 table

There was a statistical significance between presence of reproductive system symptoms and sex, as it was more common in females (45%) than in males (15%) with a P value of >0.05.

Crosstab				
Count				
		Does the patient have reproductive symptoms?		Total
		No	Yes	
sex	male	56	10	66
	female	47	37	84
Total	103	47	150	

There was an important correlation between the age of the patients and presence of cardiovascular and gastrointestinal symptoms.

The mean age of the patients of whom don't suffer from gastrointestinal symptoms was 42 years while the mean age was 44 years in those who presented with gastrointestinal symptoms. Which shows an increased incidence in occurrence of symptoms and being in old ages.

Same results were found in patients who presented with cardiovascular symptoms, as the mean age of those individuals was 48 years compared to those who didn't have cardiovascular symptoms (39 years).

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Does the patient suffer from metabolic disturbances?	Between Groups	14.869	55	.270	1.157	.264
	Within Groups	21.964	94	.234		
	Total	36.833	149			
Does the patient suffer from neurological symptoms?	Between Groups	3.665	55	.067	.849	.743
	Within Groups	7.375	94	.078		
	Total	11.040	149			
Does the patient suffer from cardiovascular symptoms?	Between Groups	16.866	55	.307	1.827	.005
	Within Groups	15.774	94	.168		
	Total	32.640	149			
Does the patient suffer from reproductive system disturbances?	Between Groups	14.309	55	.260	1.361	.094
	Within Groups	17.964	94	.191		
	Total	32.273	149			
Does the patient suffer urinary tract symptoms?	Between Groups	10.576	55	.192	1.045	.419
	Within Groups	17.298	94	.184		
	Total	27.873	149			
Does the patient suffer from gastrointestinal symptoms?	Between Groups	22.111	55	.402	1.558	.029
	Within Groups	24.262	94	.258		
	Total	46.373	149			

Discussion

Pituitary gland tumors grow abnormally in the pituitary gland. Some of those tumors produce too many hormones that control vital body functions. Otherwise, some of pituitary gland tumors produce lower levels of hormones than normal levels that normal pituitary gland dose.

Most pituitary tumors are benign adenomas; adenomas remain in situ tissues of the pituitary gland, it does not break out to other parts of the body [1-4].

Adenomas pituitary gland tumors are not similar in term of first symptom arise; yet some of them are discovered by chance of Proceeding MRI or CT for another reason.

Pituitary tumors that produce hormones can cause a variety of changes and symptoms according to types of hormones. On the other hand, pituitary tumors that do not produce any hormones

mostly present symptomatically in dynamic changes such as pressing on nearby bones that leads to headache and loss of peripheral vision [1].

Besides, pituitary tumors that produce hormones can lead to Nausea and vomiting, weakness, feeling cold, lack or absence of menstruation, Nipple discharge, sexual dysfunction, Low sperm count, hyperglycemia, weight loss, hypertension, joint pain, heart problems, Depression and easily rushing.

This study shows a statistical significance between gender types, age and BMI comparing to terms of symptoms [1-5].

Another study that was conducted in the University of Rochester shows that 60% of pituitary tumors can cause visual disturbances, which this study approves [2].

Highly levels of producing growth hormone leads to cartilage destruction [3-5].

Arthritis and joint pain may present as the first symptom of acromegaly, which this study shows in presentence of 16% in total patients [3].

The most common procedure to diagnose the pituitary tumor is CT scan (computerized tomography), but Gadolinium MRI is the best procedure to differentiate between aneurysm and pituitary tumors [3, 7-11].

Declaration

Acknowledgments: We are thankful to the management of the Syrian Private University and for their support in the field of medical training and research. We are thankful to everyone who participated in this study.

Funding: This research received no specific grant from SPU or any other funding agency in the public, commercial or non-profit sectors.

Availability of Data and Materials: All data related to this paper's conclusion are available and stored by the authors. All data are available from the corresponding author on a reasonable request.

Ethics Approval and Consent to Participate: This study was approved by the Institutional Review Board (IRB) at the Syrian Private University (SPU). All Participants confirmed their written consent by signing the consent form. Participation in the study was voluntary and participants were assured that anyone who was not inclined to participate or decided to withdraw after giving consent would not be victimized. All information collected from this study was kept strictly confidential.

Consent for Publication: Not applicable.

Competing Interests: The authors declare that they have no competing interests.

Authors' Contributions: OET, MAR, and TH were responsible for study design, literature search, and write-up; MAR was responsible for data analysis; OET participated in literature search and write-up; TH participated in the study design and reviewed the final draft. All authors read and approved the final draft.

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