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ORIGINAL ARTICLE

Outcome of Sellar and Suprasellar Brain Tumors with Retractorless Modified Subfrontal Approach

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ABSTRACT

Aim: To determine the outcome of sellar and suprasellar brain tumors with retractorless modified subfrontal approach.
Study design: Descriptive/observational study
Place and duration of study: Department of Neurosurgery, Liaquat University Hospital Hyderabad/Jamshoro from 1st March 2020 to 28th February 2021.
Methodology: Fifty patients of sellar and suprasellar brain tumors age between 15-70 years were enrolled. Patients details demographics age, sex and body mass index were recorded after taking written consent. The inter-hemispheric front-basal technique was used for all patients and the average follow-up time was 6 months. Postoperatively, magnetic resonance imaging (MRI) and computerized tomography (CT) scans in all patients were performed. After 12 hours, the postoperative CT scan was performed to monitor for persistent tumor and hemorrhage cerebral edema following an operation.
Results: There were 30 (60%) male patients and 20 (40%) female patients. Mean age of the patients were 28.36±14.88 years with mean BMI 23.16±7.54 kg/m^2. Most of the patients 20(40%) were from age group 15-30 years, followed by 31-40 years in 12 (24%) patients. Frequency of pituitary adenoma was found in 22 (44%) cases, craniopharyngioma found in 19 (38.7%) cases, arachnoid cyst found in 4 (8%), keratin flakes in 2 (4%) cases, benign giant cell tumor found in 2 (4%)olfactory groove meningioma in 1 (2%) and epidermoid in 1 (2%) cases. Post operatively 35 (70%) patients were completely recovered, complications found in 13 (26%) patients who were recovered later and frequency of not recovered patients was 2 (4%). According to Karnofsky performance, 16 (32%) patients had scale 30, scale 60 was in 2 (4%) cases, scale 70 in 4 (8%) patients, scale 80 in 19 (38%) and scale 90 in 9 (18%).
Conclusion: This retractorless method is very effective and safe in the sellar and suprasellar region for excision of big tumors. This method allows the huge tumor to be removed without serious complication.
Keywords: Sub-frontal approach, Sellar, Suprasellar, Brain tumor, Retractorless method

INTRODUCTION

The pituitary gland, which is slightly above sella turcica, is regulated by the hypothalamus. The inner carotid arteries; cranial nerves III, IV and VI; and the cranial nerve divisions V are found within the cavernous sinus. The hypophysis runs through the diaphragm sella and contains the neural veins and processes on the pituitary hormones are produced different endocrine cell types include thyroid-stimulating hormone (TSH), prolactin, growth hormone (GH), follicular-stimulating hormone (FSH) and luteinizing hormone (LH) are secreted by the anterior hipophysis. Post-hypophysis secrets antidiuretic (ADH) hormone and oxytocin.[1-9]

The annual incidence of hypophysiologic adenoma per 1 million people is between 10% and 15% of intracranial primary tumors. Hypophysical tumors of less than 10 mm of diameter are referred to as microadenoms, more than 10 mm macroadenomas, and more than 4 cm tumors are referred to as gigantic adenoms. In middle-aged women, microadenomas arise and also in elderly age men macroadenomas arise. About 30% of hypophysical tumors are categorized as non-functioning adenomas and show pressure sensations[4].

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On plain radiography, we could distinguish and widen the sella and doubled sellar floors. The size and location of the lesion and its connection with surrounding structures is demonstrated by magnetic resonance imaging. Studies reported that computed tomography scan is very helpful to see the sphenoid sinus architecture.[10,11]

The first-line treatment approach for unfunctioning adenomas is regarded as an endoscopic transsphenoidal tumor excision. A transcranial technique is employed with considerable supratentorial tumor growth, following surgery at least 4 to 6 weeks after the surgery should be performed[12-14].

The objective of the study was to determine the outcome of sellar and suprasellar brain tumors with retractorless modified subfrontal approach

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted at Department of Neurosurgery, Liaquat University Hospital Hyderabad/Jamshoro from 1st March 2020 to 28th February 2021 after approval from Ethical Committee. This study comprised of 50 patients. Patients details demographics age, sex and body mass index were recorded after taking informed written consent. Patients with history of operated pituitary tumors and those did not give written consent were excluded. Patients were aged between 15-70 years. The inter-hemispheric front-basal technique was used for all

patients and the average follow-up time was 6 months. Postoperatively, MRI and CT scans in all patients were performed. After 12 hours, the postoperative CT scan was performed to monitor for persistent tumor and hemorrhage cerebral edema following an operation. Complete data was analyzed by SPSS 20.

RESULTS

Thirty (60%) patients were males and 20(40%) were females. Mean age of the patients were 28.36±14.88 years with mean BMI 23.16±7.54 kg/m^2. Most of the patients 20(40%) were from age group 15-30 years, 12(24%) patients were between 31-40 years, 10(20%) were between 41-50 years and 8(16%) were >50years (Table 1).

The pituitary adenoma was found in 22(44%) cases, craniopharyngioma found in 19(38%) cases, arachnoid cyst found in 4 (8%), keratin flakes in 2(4%) cases, benign giant cell tumor found in 2(4%) olfactory groove meningioma in 1(2%) and epidermoid in 1(2%) cases (Table 2).

According to Karnofsky performance, 16(32%) patients had scale 30, scale 60 was in 2(4%) cases, scale 70 in 4 (8%) patients, scale 80 in 19(38%) and scale 90 in 9 (18%) [Table 3]. Post operatively 35(70%) patients were completely recovered, complications found in 13(26%) patients who were recovered later and frequency of not recovered patients was 2 (4%) [Table 4].

Table 1: Baseline details demographics of enrolled cases (n=50

Variable	No.	%
Gender		
Male	30	60.0
Female	20	40.0
Age (years)		
15-30	20	40.0
31-40	12	24.0
41-50	10	20.0
> 50	8	16.0
Mean age	28.36±14.88	
Mean BMI	23.16±7.54	

Table 2: Occurrence of tumors among enrolled cases (n=50)

Variable	No.	%
Pituitary adenoma	22	44.0
Craniopharyngioma	19	38.0
Arachnoid cyst	4	8.0
Keratin flakes	2	4.0
Benign giant cell tumor	1	2.0
Olfactory groove meningioma	1	2.0
Epidermoid	1	2.0

Table 3: Association of Karnofsky Performance scale (n=50)

Karnofsky Score	No.	%
30	16	32.0
60	2	4.0
70	4	8.0
80	19	38.0
90	9	18.0

Table 4: Frequency of post-operative outcomes (n=50)

Outcome	No.	%
Recovered	35	70.0
Complication	13	26.0
Not recovered	2	4.0

DISCUSSION

Supracellular cancers that assault the huge sinus in particular are more attracted by a transcaveral frontotemporal approach.[15,16] The best long-term results of patients can be added to tumor extraction in the main setting. The large size of tumors, greater the chances of harm to the cerebral structures that are necessary.[17] A subtemporal technique is used for removing malignancies from the back of the fossa.[18] Although this methodology may indeed damage the worldly outlook and care is tight and poorly arranged.

In the present study, 30 (60%) patients were male and 20 (40%) were females. Mean age of the patients were 28.36±14.88 years with mean BMI 23.16±7.54 kg/m^2. Our findings were comparable to the previous study.[19] Most of the patients 20 (40%) were from age group 15-30 years. In 47% of patients, Baskin and Wilson[20] used subfrontal technique. The results demonstrate that the tumor has been aggregated in just seven patients, six of whom did not repeat tumor removal. Nevertheless, 91% of the patients slacken and two kick the bucket. This test means that radiation is a satisfactory treatment for malignancies through subtotal evacuation and showed that 35 (70%) patients were completely recovered, complications found in 13 (26%) patients who were recovered later and frequency of not recovered patients was 2 (4%). This was comparable to the previous study.[21]

In a study of 144 patients, Yasargil and colleagues[22] used different techniques. In 90% of the patients, up to tumor extraction was performed and 7% again. It proposes the best long-term results for patients to obtain vital aggregate tumor expulsion. Then early determination when the tumor is still small, improves the probability of completed expulsion and achieves remarkable results.

We noticed that pituitary adenoma was found in 22 (44%) cases, craniopharyngioma found in 19 (38%) cases, arachnoid cyst found in 4 (8%), keratin flakes in 2 (4%) cases, benign giant cell tumor found in 2 (4%) olfactory groove meningioma in 1 (2%) and epidermoid in 1 (2%) case.[19] Karnofsky performance scale was used in our study. Sharma and Sawarkar[23] presented that awareness of the requirement for early diagnostic imaging and developments in the various imaging modalities allow for an early diagnosis if the lesions are still of moderate dimension and thus can be processed using microscope or an endoscope with minimally invasive techniques. Progress in neuronavigation and endoscopic equipment allowed for treatment with less stressful methods of these lesions via fewer surgical pathways. A minimum access but similarly invasive and direct way for central skull base tumors to get exposed is an endoscopic endonasal approach and no brain retraction is necessary[24-26].

In another study, Shirane et al[27] presented that the fronto-basal interhemispheric approach is appropriate for removing craniopharyngiomas that extend out of sellar-suprasellar regions even through a narrow craniotomy window. Using this strategy, the pituitary stalk, structures hypothalamic and perforating agents can be removed without substantial sequelae associated to the surgical technique. This method provides a safe and minimally invasive method of craniopharyngioma treatment.

CONCLUSION

This retractorless method is very effective and correct in the sellar and suprasellar region for excision of big tumors. This method allows the huge tumor to be removed without serious disease.

Conflict of interest: Nil

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