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SNI: Neuro-Oncology

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Review Article

The effect of radiation therapy and chemotherapy on malignant craniopharyngioma: A review

Turki Elarjani[1], Meshari Rashed Alhuthayl[2], Hindi Alhindi[3], Imad N Kanaan[2]

[1]Department of Neurological Surgery, University of Miami MILLER School of Medicine Jacson Memorial Hospital, Miami, Florida, United States, [2]Neurosciences Center, King Faisal Specialist Hospital and Research Center, [3]Department of Pathology and Laboratory Medicine, King Faisal specialist Hospital and Research Center, Riyadh, Saudi Arabia.

E-mail: Turki Elarjani - telarjani@gmail.com; Meshari Rashed Alhuthayl - meshari.neurosurgery@gmail.com; Hindi Alhindi - hal-hindi@kfshrc.edu.sa; *Imad Kanaan - dr.imad.kanaan@gmail.com

***Corresponding author:**
Imad N Kanaan,
Neurosciences Center, King Faisal Specialist Hospital and Research Center, Riyadh, Saudi Arabia.

dr.imad.kanaan@gmail.com

Received : 02 July 2021
Accepted : 01 September 2021
Published : 25 October 2021

DOI
10.25259/SNI_664_2021

Quick Response Code:

ABSTRACT

Background: Malignant craniopharyngioma is a rare tumor with few published case reports. It can form *de novo* or transform from a benign variant and is associated with a dismal survival rate. We reviewed the literature for all published cases and studied the effect of radiation on the rate of malignant transformation. We analyzed the effect of chemotherapy on survival.

Methods: We used various search engines to locate literature from 1980 onward and identified 31 case reports, one of which was excluded. Statistical analysis using the SAS software was conducted, and a significant value was identified if $P < 0.05$.

Results: There was equal distribution among male and female patients. The average age at malignant diagnosis is 31.11 years (±15.16) and 12.19 years (±8.41) for the average interval of benign tumor progression to malignancy. The most common clinical presentation was visual loss and/or field deficits in 26/30 patients (86%). Almost 11/30 patients (37%) had endocrinological deficits, with panhypopituitarism as the most common in 8/11 patients (73%). Fifteen patients received radiation before malignant transformation (47%) and demonstrated no effect on malignant transformation ($P = 0.379$). Gross total resection was achieved in 2/30 patients. The average time to mortality postoperatively is 5.3 months ± 4.3. Ten patients received chemotherapy, and five were alive at last follow-up ($P = 0.115$).

Conclusion: Malignant craniopharyngioma carries a dismal prognosis with no apparent benefits of radiation therapy and chemotherapy on survival.

Keywords: Craniopharyngioma, Pituitary, Recurrent

INTRODUCTION

Craniopharyngioma is an uncommon, benign epithelial tumor derived from buccal mucosa rests or Rathke's pouch remnants.[7] Two histological subtypes define it: adamantinomatous, originating from Rathke's pouch, and papillary, arising from the buccal mucosa rests. They comprise 2–5% of all primary intracranial tumors, with an overall incidence rate of 1.6–2.14/million/year.[5,6,19] There is a bimodal peak incidence rate in the pediatric age group (5–9 years) and adults (40–44 years).[5,19]

Rarely, craniopharyngiomas present as a *de novo* malignant tumor or a transformation from an already existent benign tumor. The few case reports published in the literature demonstrated high morbidity and mortality rates.[26,30] We present our review of the literature on malignant craniopharyngiomas and analyze the current data. We aim to answer two questions: (1) whether radiation therapy prevents or prolongs secondary malignant transformation and (2) whether chemotherapy portends a positive survival in patients diagnosed with *de novo* and secondary malignant craniopharyngioma.

MATERIALS AND METHODS

A literature review in Medline, Web of Science, and Scopus was used to locate existing case reports. The search included the following terms: "craniopharyngioma" AND "malignancy" OR "high-grade" OR "malignant transformation." All articles written in English and published in 1980 and beyond were included in the study, while non-English articles and articles published before 1980 were excluded from the study. Articles published before 1980 had substantially different diagnostic modalities and treatment approaches not applicable in the current era. The databases were last queried in May 2020. One article did not mention the outcome of their patient, so it was excluded from the statistical summary data.

We examined different variables, such as the incidence in males and females, age at diagnosis of benign craniopharyngioma, age at diagnosis of malignant craniopharyngioma, the time interval for malignant transformation, clinical presentation, hormonal deficits, radiation therapy before and after malignant transformation, lesion recurrence (including benign craniopharyngioma), total surgeries, chemotherapy administration, histopathology, and outcome. *De novo* malignant craniopharyngioma is defined as a craniopharyngioma that was initially diagnosed as malignant in histological studies. Secondary malignant craniopharyngioma is defined as a craniopharyngioma that was initially diagnosed as benign and then underwent malignant transformation overtime. Headache was a subjective complaint by the patients in the case reports, while visual loss and/or field and diplopia were subjective complaints and objective findings on physical examination. Most articles did not mention the instrument used in the transsphenoidal approach (endoscopic vs. microscopic).

CASE ILLUSTRATION

This is a 27-year-old female who was diagnosed with benign craniopharyngioma in 1999 and had underwent a right pterional craniotomy with subtotal resection (STR), followed by 50.4 Gy in 28 fractions radiation. She received hormonal replacement due to panhypopituitarism, and in 2017, the patient presented with progressive fatigue and thirst and polyuria and bitemporal hemianopsia. Magnetic resonance imaging (MRI) and computed tomography (CT) demonstrate a suprasellar cystic lesion [Figure 1].

The patient underwent a right pterional craniotomy and reresection of the lesion and her clinical symptoms improved with persistent panhypopituitarism. Histopathology revealed malignant features of the lesion [Figures 2 and 3]. In 2018, the patient presented again with hypothalamic dysfunction symptoms such as fatigue, obesity, disturbed sleep cycle, and fever of unknown origin and she was blind in the right eye with the left temporal visual field hemianopsia in the left eye. MRI shows recurrent lesion extending to the right middle fossa [Figure 4]. The patient underwent resection of the right middle fossa tumor. The patient was seen in the outpatient department in 2020 and repeat MRI significant interval growth of the suprasellar mass occupying the anterior third ventricle and the interpeduncular cistern with evident mass effect on the surrounding neurovascular structures. The patient continues on hormonal therapy and close outpatient.

Statistical analysis

We used the Statistical Analysis System (SAS) software (SAS version 9.4, SAS Institute Inc., Cary, NC, USA) for

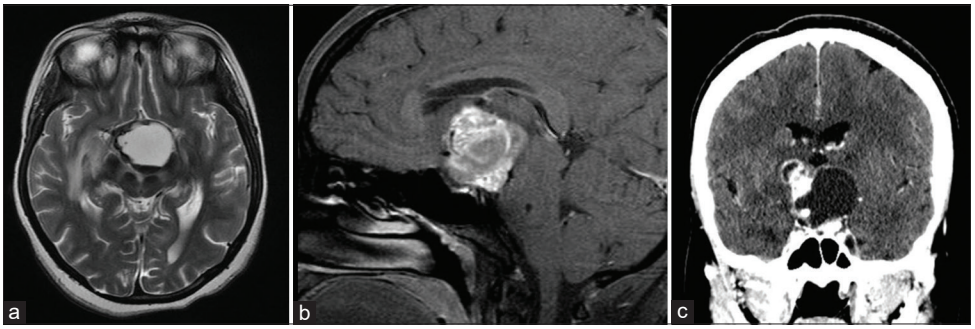

Figure 1: Axial magnetic resonance imaging (MRI) T2 (a) sagittal MRI T1 with contrast (b) and computed tomography (CT) coronal view (c) revealing a large cystic lesion with solid component occupying the suprasellar region exerting mass effect on the surrounding neurovascular structure CT image is showing the calcification component of the lesion.

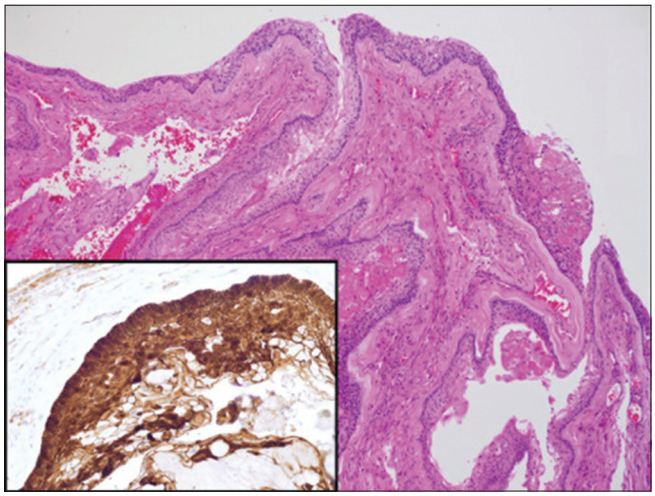

Figure 2: Intermediate magnification view of the low-grade component comprising the typical epithelium and wet keratin and the nuclear expression is depicted in the inset (H&E original magnification ×100 inset beta-catenin immunohistochemistry original magnification ×200).

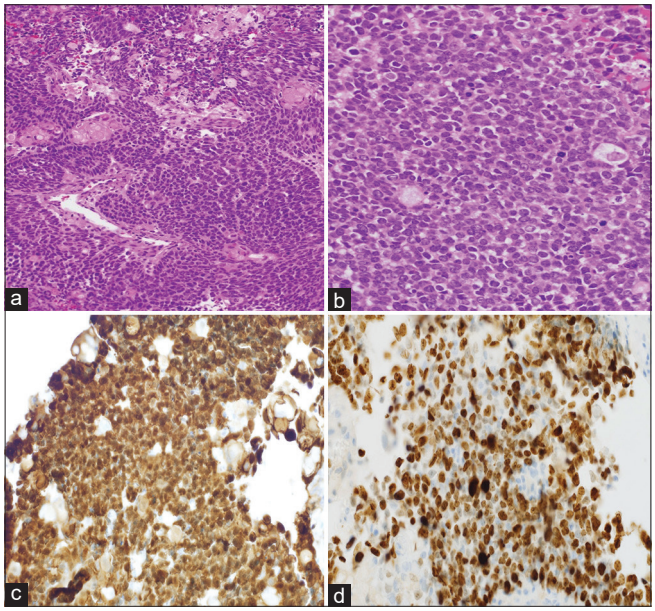

Figure 3: Low magnification view of the malignant component showing the highly cellular epithelial sheets (a) and high magnification (b) shows the high nucleus-cytoplasm ratio and nuclear atypia and scattered mitotic figures. Note the nuclear expression of beta-catenin (c) and the high MIB-1 proliferation index (d) (a: H&E original magnification ×40 and b: H&E original magnification ×400 and c: beta-catenin immunohistochemistry original magnification ×200 and d: Ki-67 immunohistochemistry original magnification ×200).

statistical analysis. Categorical variables are presented as frequency and percentage and continuous variables are presented as mean (standard deviation) for normal distribution and median (interquartile range) for non-normal distribution of the data. We performed an independent *t*-test analysis for normally distributed quantitative variables and a Mann–Whitney U-test for non-normally distributed quantitative variables. A Chi-square analysis was used for qualitative variables, and Fisher's exact test was used for variables with a sample number below 5.

RESULTS

We identified 31 patients satisfying the inclusion criteria published between 1988 and 2020 [Table 1]; however, in one case report, the authors did not follow the patient postoperatively, and it was thus excluded from the statistical analysis. We found a total of 8/30 (27%) patients with *de novo* craniopharyngiomas, two of whom are pediatric patients. Of the 30 patients included, we provided one case illustration from our patient data bank [Figures 1-5]. The distribution was equal between males (15/30) and females (15/30); five pediatric patients were listed, and 4/5 were male [Table 2]. The average age at diagnosis of benign craniopharyngioma was 19.5 years (±13.6); the average age at diagnosis of malignant craniopharyngioma was 31.11 years (±15.16); the average interval in years for malignant transformation was 12.19 years (±8.41).

Visual loss and/or field deficits were the most common clinical presentation in 26/30 (86%); headaches were the 2nd most common clinical presentation in 24/30 (80%); 4/30 presented with diplopia (13%). Only 1/30 patient with *de novo* craniopharyngiomas had hormonal imbalance and 8/30 had visual deficits. Eleven patients had hormonal impairment upon diagnosis of malignant craniopharyngioma (37%). Of these, 8/11 suffered from pan-hypopituitarism (73%), 7/11 from diabetes insipidus (DI) (64%), 2/11 from hypothyroidism (18%), 2/11 from hypocortisolism (18%), and 1/11 from hypogonadism (9%) [Figure 6].

Fifteen patients received radiation therapy before the malignant transformation (50%), and 5/30 received radiation therapy after the diagnosis of malignant craniopharyngioma (17%). There was no statistical significance in radiation therapy before malignant transformation and the rate of benign to malignant transformation (P = 0.379). Patients with a *de novo* malignant craniopharyngioma were excluded from the analysis to specifically study the benign to malignant transformation with radiation therapy. The median total recurrences were 3 (0–5), and the median total surgeries were 3 (1–5).

Twenty patients underwent a transcranial approach (67%), while 10/30 underwent transsphenoidal surgery (33%). Gross total resection (GTR) was achieved in 2/30 through the transcranial approach. Nine patients received chemotherapy (30%). The most common pathology type was adamantinomatous in 22/30 (73%); the papillary pathology

Table 1: Summary of cases from the literature.

Author and date	Sex	Age at initial diagnosis and malignant trans formation	*De novo* versus secondary	Clinical presentation	Hormonal impairment	Radiation therapy	Total recurrence and surgeries	Chemotherapy	Histology type	Outcome
Current case (2020)	Female	10 years 27 years (17-year interval)	Secondary	Headache, fatigue, increased appetite, visual field disturbance	Pan-hypopituitarism +DI	Received before and after diagnosis of malignant craniopharyngioma	Four recurrences Three subtotal resections	None	Adamantinomatous	Alive at 3 years follow-up
Wang *et al.*[17] (2020)	Female	5 years 25 years (20-year interval)	Secondary	Headache, visual acuity/field deficits	Pan-hypopituitarism +DI	Received before diagnosis	Two recurrences Four near-total resections	None	Adamantinomatous	Died at 3 months follow-up
Wang *et al.* (2020)	Male	14 years 24 years (10-year interval)	Secondary	Headache, visual acuity/field deficits	Pan-hypopituitarism +DI	Received before diagnosis	Two recurrences Three debulking surgeries	None	Adamantinomatous	Dead (no specific time described)
Wang *et al.* (2020)	Female	30 years 37 years (7-year interval)	Secondary	Headache, visual acuity/field deficits, diplopia	Pan-hypopituitarism +DI	None	One recurrence Three debulking surgeries	None	Not mentioned	Died at 13 months follow-up
Wang *et al.* (2020)	Male	Diagnosed at the age of 2.7 years, no initial benign diagnosis	*De novo*	Headache, visual acuity/field deficits, facial palsy	Hypocortisolemia	None	Zero recurrence One near-total resection	None	Adamantinomatous	Alive at 12 months follow-up
Wang *et al.* (2020)	Male	3 years 18 years (15-year interval)	Secondary	Headache, visual acuity/field deficits	Pan-hypopituitarism +DI	Received before diagnosis	Two recurrences Three near total resections (TSS)	None	Not mentioned	Alive at 9 months follow-up
Wang *et al.* (2020)	Male	Diagnosed at the age of 10 years, no initial benign diagnosis	*De novo*	Headache, visual acuity/field deficits	None	None	Zero recurrence One gross total resection	None	Adamantinomatous	Alive at 3 months follow-up

(*Contd*...)

Table 1: *(Continued)*

Author and date	Sex	Age at initial diagnosis and malignant trans formation	*De novo* versus secondary	Clinical presentation	Hormonal impairment	Radiation therapy	Total recurrence and surgeries	Chemotherapy	Histology type	Outcome
Wang *et al.* (2020)	Male	31 years 38 years (7-year interval)	Secondary	Headache	None	None	One recurrence Two gross total resections	None	Papillary	Alive at 21 months follow-up
Nomura *et al.*[20] (2018)	Male	Diagnosed at the age of 20 years, no initial benign diagnosis	*De novo*	Headache and visual loss	None	None	Two recurrences Two subtotal resections	None	Adamantinomatous	Died at 4 months follow-up
Narla *et al.*[17] (2017)*	Female	7 years 28 years (21-year interval)	Secondary	Headache and visual disturbance	Panhy popituitarism	Received before and after diagnosis	Two recurrences Three near total resections	None	Adamantinomatous	Lost to follow-up
Jeong *et al.*[12] (2017)	Male	26 years 28 years (2-year interval)	Secondary	Headache, visual loss	Pan-hypopituitarism +DI	None	Two recurrences Two subtotal resections	None	Adamantinomatous	Died at 7 months follow-up
Beer-Furlan *et al.*[2] (2016)	Male	20 years 40 years (20-year interval)	Secondary	Visual loss	None	Received before and after	Four recurrences Four subtotal resections (TSS)	Received (name not mentioned)	Not mentioned	Hospice care
Chunhui *et al.*[4] (2016)	Female	30 years 37 years (7-year interval)	Secondary	Visual loss	None	None	Three recurrences Three subtotal resections (TSS)	None	Not mentioned	Died at 3 months follow-up

(*Contd...*)

Table 1: *(Continued)*

Author and date	Sex	Age at initial diagnosis and malignant trans formation	*De novo* versus secondary	Clinical presentation	Hormonal impairment	Radiation therapy	Total recurrence and surgeries	Chemotherapy	Histology type	Outcome
Negato *et al.*[18] (2015)	Male	12 years 36 years (24-year interval)	Secondary	Visual loss and diplopia	None	Received before diagnosis	Five recurrences Five subtotal resections (TSS)	Received (docetaxel, fluorouracil, and cisplatin)	Adamantinomatous	Alive at 12 months follow-up
Signorelli *et al.*[24] (2015)	Female	11 years 25 years (14-year interval)	Secondary	Visual loss and diplopia	None	Received before only	Four recurrences Four subtotal resections (TSS)	None	Adamantinomatous	Died at 6 months follow-up
Wang *et al.*[31] (2015)	Male	29 years 30 years (1-year interval)	Secondary	Visual loss, headache	Hypothyroidism and hypocortisolism	Received before only	Three recurrences Three subtotal resections	None	Adamantinomatous	Died at 5 months follow-up
Gao *et al.*[8] (2011)	Female	37 years 41 years (4-year interval)	Secondary	Visual loss and field deficits, headache	None	None	Three recurrences Three subtotal resections (TSS)	None	Adamantinomatous	Died at 3 months follow-up
Lauriola *et al.*[15] (2011)	Female	Diagnosed at the age of 66 years, no initial benign diagnosis	*De novo*	Visual loss and field deficits, headache	None	Received after diagnosis	One recurrence Two subtotal resections (TSS)	None	Adamantinomatous	Died at 15 months follow-up
Ujifuku *et al.*[27] (2010)	Male	32 years 42 years (10-year interval)	Secondary	Visual loss	Hypothyroidism and hypogonadism	Received before only	Five recurrences Five subtotal resections	Received (not mentioned)	Adamantinomatous	Died at 1 month follow- up

(*Contd...*)

Table 1: *(Continued)*

Author and date	Sex	Age at initial diagnosis and malignant trans formation	*De novo* versus secondary	Clinical presentation	Hormonal impairment	Radiation therapy	Total recurrence and surgeries	Chemotherapy	Histology type	Outcome
Aquilina *et al.*[1] (2010)	Male	4 years 12 years (8-year only)	Secondary	Headache and visual loss	None	Received before and after	Five recurrences Five subtotal resections	Received (carboplatin and cetuximab)	Papillary	Died at 6 months follow-up
Aquilina *et al.* (2010)	Female	6 years 13 years (7-year interval)	Secondary	Headache	None	Received before and after	One recurrence Two near total resections (TSS)	Received (paclitaxil and carboplatin)	Adamantinomatous	Alive at 10 months follow-up
Boongird *et al.*[3] (2009)	Female	Diagnosed at the age of 46 years, no initial benign diagnosis	*De novo*	Headache and visual loss	None	None	Zero recurrence One subtotal resections	None	Adamantinomatous	Died at 1-week follow-up
Ishida *et al.*[10] 2009)	Male	Diagnosed at the age of 6 years, no initial benign diagnosis	*De novo*	Headache and visual loss	None	Received before only	Three recurrences Three subtotal resections	Received (cyclo phosphamide, cisplatin, etoposide)	Adamantinomatous	Alive at 10 months follow-up
Jaggon *et al.*[11] (2009)	Female	Diagnosed at the age of 54 years, no initial benign diagnosis	*De novo*	Headache and visual loss, diplopia	None	None	Zero recurrence One subtotal resection (TSS)	None	Not mentioned	Died at 2 weeks follow-up
Rodriguez *et al.*[22] (2007)	Male	Diagnosed at the age of 31 years, no initial benign diagnosis	*De novo*	Headache and visual loss	None	None	Two recurrences Two subtotal resections	None	Not mentioned	Died at 3 months follow-up

(*Contd...*)

Table 1: *(Continued)*

Author and date	Sex	Age at initial diagnosis and malignant trans formation	*De novo* versus secondary	Clinical presentation	Hormonal impairment	Radiation therapy	Total recurrence and surgeries	Chemotherapy	Histology type	Outcome
Rodriguez *et al.* (2007)	Female	58 years 60 years (2-year interval)	Secondary	Headache and lethargy	Panhy popituitarism	None	Three recurrences Three subtotal resections	None	Adamantinomatous	Died at 2 months follow-up
Rodriguez *et al.* (2007)	Male	14 years 22 years (8-year interval)	Secondary	Headache and left arm weakness	None	Received before only	Four recurrences Four subtotal resections	None	Adamantinomatous	Died at 12 months follow-up
Plowman *et al.*[21] (2004)	Female	6.5 years 21 years (14.5-year interval)	Secondary	Headache and visual loss	None	Received before and after	Four recurrences Three subtotal resections	Received (cisplatin and etoposide)	Adamantinomatous	Died at 6 months follow-up
Kristopaitis *et al.*[14] (2000)	Female	27 years 42 years (15-year interval)	Secondary	Headache, visual acuity/ field deficits	None	Received before only	Five recurrences Five subtotal surgeries (TSS)	Received (paclitaxil and carboplatin)	Adamantinomatous	Alive at last follow (no duration mentioned)
Virik *et al.*[29] (1999)	Male	24 years 34 years (10-year interval)	Secondary	Visual loss	Pan-hypopituitarism +DI	Received before only	Three recurrences Three subtotal resections	Received (carboplatin and etoposide)	Adamantinomatous	Died at 10 months follow-up
Nelson *et al.* (1988)	Female	12 years 49 years (37-year interval)	Secondary	Headache and visual loss	None	None	Five recurrences Five subtotal resections	None	Adamantinomatous	Died at 3 months follow-up

*Excluded from statistical summary in Table 2. TSS: Trans-sphenoidal surgery

type was found in 2 patients (7%). Six articles did not specify the original pathology type and only commented on the squamous cell histologic appearance. Total patient mortality was 20/30 (67%), with an average time to mortality of 5.3 months ±4.3 (0.1–15). There was no statistical significance between chemotherapy and longer survival ($P = 0.115$).

DISCUSSION

Malignant craniopharyngioma was first described in 1973 as a *de novo* squamous carcinoma of the sella turcica.[23] Benign craniopharyngioma tends to have a bimodal distribution in children and adults with a similar male-to-female ratio,[5,7,19] whereas malignant craniopharyngioma is more common in adults than children. The average age of developing a malignant craniopharyngioma is 31.11 years (2.7–66), with an equal male-to-female distribution.

The adamantinomatous histology subtype occurs in both adult and pediatric patients and can be morphologically solid or cystic; the papillary subtype almost always develops in adults (34.3%) and is mostly solid in morphology.[5,7] Similarly, malignant craniopharyngiomas have no unique radiological manifestation and can appear as a mixed solid and cystic component.[26,30] Interestingly, malignant transformation generally arises from an adamantinomatous subtype (73%). It is worth noting that a benign adamantinomatous craniopharyngioma is more aggressive and more firmly adheres to the adjacent vital neurovascular structures than the papillary type.[9,32] This may explain the rate of malignant transformation in the adamantinomatous subgroup.

The pathological appearances of a malignant craniopharyngioma are a marked nuclear atypia, a high nucleus-to-cytoplasm ratio, and robust mitotic activity.[1,22,26,27] Important immunohistochemical markers for malignant transformation were Ki-67 proliferation index, p53, MIB-1 proliferation index, and p63.[4,10,31] We noticed that a Ki-67 proliferation index as low as 15% was associated with a craniopharyngioma malignant transformation.

The clinical presentation of benign craniopharyngioma is related to headaches (53%), visual deficits (75%), and diplopia (5%).[28] Rarely, patients may present with muscle weakness, unsteady gait, or lower cranial nerve dysfunction.[7,28] However, patients with a malignant craniopharyngioma have a comparable clinical presentation to those with its benign counterpart, with visual deficits as the most common finding (83%) followed by headache (80%) and diplopia (13%).

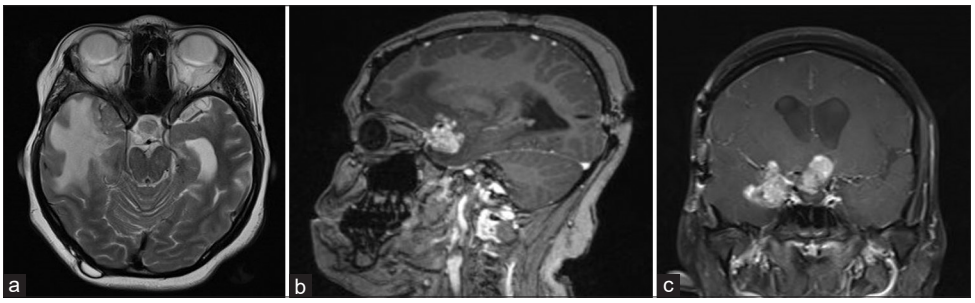

Figure 4: Axial magnetic resonance imaging (MRI) T2 (a) and sagittal MRI T1 with contrast (b) and coronal MRI T1 with contrast (c) demonstrating a lesion recurrence in the suprasellar region with new extension to the right middle cranial fossa and surrounding right temporal vasogenic edema is noted. Occipital VP shunt is visible on the sagittal image.

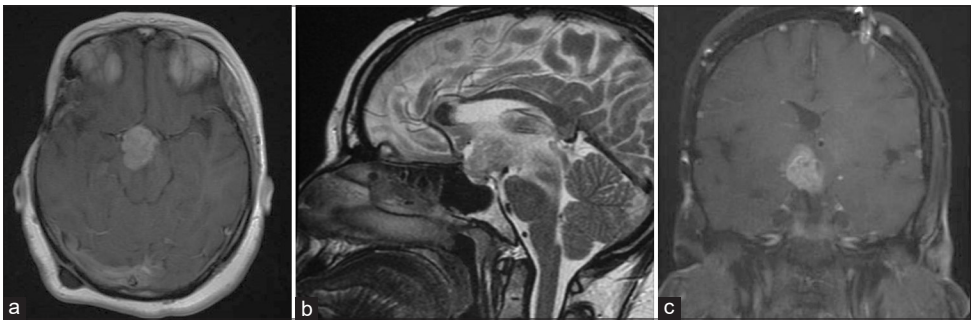

Figure 5: Repeat axial magnetic resonance imaging (MRI) with contrast in 2020 (a) and sagittal MRI T2 (b) and coronal MRI T1 with contrast (c) showing significant interval growth of the suprasellar mass occupying the anterior third ventricle and the interpeduncular cistern with evident mass effect on the surrounding neurovascular structures.

Table 2: Statistical summary of findings.

Total patients (*n*=30)*	**15 males; 15 females**
Pediatric patients (*n*=5)	**4 males; 1 female**
Age at diagnosis of benign craniopharyngioma, mean±STDEV (range)	19.5 years±13.6 (3–58)
Age at diagnosis of malignant craniopharyngioma, mean±STDEV (range)	31.11 years±15.16 (2.7–66)
Interval of progression to high grade, mean±STDEV (range)	12.19 years±8.41 (0–37)
De novo malignant transformation, *n* (%)	8/30 (27%)
Clinical presentation	
Headache, *n* (%)	24/30 (80%)
Visual loss and/or field deficits, *n* (%)	26/30 (86%)
Diplopia, *n* (%)	4/30 (13%)
Hormonal impairment at presentation	11/30 (37%)
Pan-hypopituitarism, *n* (%)	8/11 (73%)
DI, *n* (%)	7/11 (64%)
Hypothyroidism, *n* (%)	2/11 (18%)
Hypocortisolism, *n* (%)	2/11 (18%)
Hypogonadism, *n* (%)	1/11 (9%)
Radiation therapy	
Before diagnosis of malignant craniopharyngioma, *n* (%)	15/30 (50%)
After diagnosis of malignant craniopharyngioma, *n* (%)	5/30 (17%)
Total recurrences, median (range)	3 (0–5)
Total surgeries, median (range)	3 (1–5)
Trans-cranial, *n* (%)	20/30 (67%)
Trans-sphenoidal, *n* (%)	10/30 (33%)
Chemotherapy, *n* (%)	9/30 (30%)
Histopathology^	
Adamantinomatous, *n* (%)	22/30 (73%)
Papillary, *n* (%)	2/30 (7%)
Mortality, *n* (%)	20/30 (67%)
Time to mortality after last surgery in months, mean±STDEV (range)	5.3 months±4.3 (0.1–15)
Patient alive on chemotherapy, *n* (%)	5/10 (50%)

*Narla *et al.* (case #10) was excluded from the statistics table, ^6 cases (20%) did not mention the pathology or subtype/pathologic subtype. STDEV: Standard deviation, DI: Diabetes insipidus

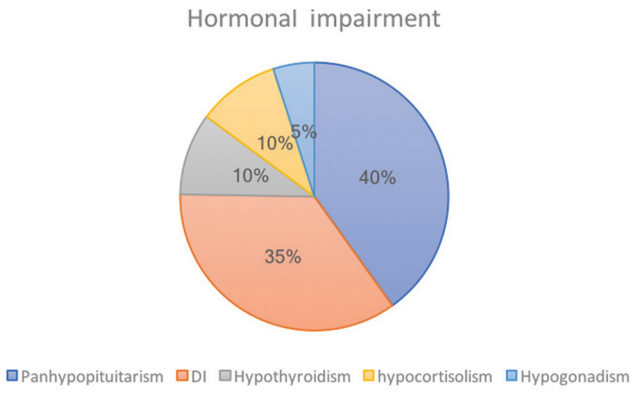

Figure 6: Summary of hormonal impairment on the diagnosis of malignant craniopharyngioma. DI: Diabetes insipidus.

Hormonal deficits of benign craniopharyngioma differ between pediatric and adult patients. Growth hormone deficits are noted in 75% of children and 20% of adults; thyroid-stimulating hormone deficiency is seen in 25% of children and 39% of adults.[16,25] Hypocortisolism is noted in 25% of children and 35% in adults; the most prominent endocrinological impairment is hypogonadism and is seen in 40% of children and 47% of adults.[16,25] DI is almost comparable in adults (21%) and children (9–17%).[16,25] Surprisingly, malignant craniopharyngioma mostly presents with panhypopituitarism and DI in 73% and 64% of patients, respectively. It can be expected that extensive pituitary hormone impairment occurs in secondary malignant craniopharyngioma, predominantly due to the preoperative radiation therapy. Our case illustration is an example of impaired hormonal activity in secondary craniopharyngiomas.

A previous publication showed that radiation therapy of benign craniopharyngiomas does not portend a higher risk of malignant transformation.[26] In addition, there was a poor association of radiation therapy dose and survival after malignant transformation.[26] Our analysis does agree with the previous studies and radiation therapy of benign

craniopharyngiomas may not slow the rate of benign to malignant transformation.

In a systematic review of benign craniopharyngioma surgical resection and outcome, almost 57% of patients had GTR.[5] Benign craniopharyngioma with STR and radiotherapy has an equivalent recurrence rate compared to GTR.[5] The difficulty in achieving GTR is attributed to the invasive nature of craniopharyngiomas and their close adherence to nearby structures. This difficulty is potentiated in the malignant type, with substantial adherence to vital anatomical structures and invasion; only 2/30 patients with a malignant craniopharyngioma underwent GTR.

In one study, the overall survival of patients with benign craniopharyngioma was 95% at 2 years, 91% at 5 years, and 83% at 10 years; the progression-free survival was 84% at 2 years, 78% at 5 years, and 60% at 10 years.[28] Another review study revealed a 5-year survival of 80–91% and 10-year survival of 83–92.7%.[13] In contrast, there is high mortality associated with malignant craniopharyngiomas, with a 67% mortality rate in our series. Patients lived less than a year, with an average duration of 5.3 months (0.1– 15). Chemotherapy administration was not associated with increased survival ($P = 0.115$).

The limitation in this manuscript is related to the very uncommon nature of malignant craniopharyngiomas, and hence, the rare, published case reports. Larger sample size is needed to ideally study the effects of radiation therapy and chemotherapy on malignant transformation and survival. In addition, individual chemotherapeutic agents should be assessed for their efficacy.

CONCLUSION

Malignant craniopharyngioma is a rare entity with few published articles in the literature. It is derived mainly from an adamantinomatous subtype and predominantly occurs in the adult population. There is a robust endocrinologic abnormality manifesting as pan-hypopituitarism, compared to benign craniopharyngiomas. It carries a high mortality rate within a year of diagnosis. Radiation therapy may not slow the rate of benign to malignant transformation, and chemotherapy may not improve survival.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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How to cite this article: Elarjani T, Alhuthayl MR, Alhindi H, Kanaan IM. The effect of radiation therapy and chemotherapy on malignant craniopharyngioma: A review. Surg Neurol Int 2021;12:539.