Transformation versus ascertainment bias of a suprasellar lesion- a histopathologic conundrum: BRAF V600E positive papillary craniopharyngioma versus Rathke's cleft cyst with squamous metaplasia

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Introduction

- Rathke's cleft cysts (RCCs) and craniopharyngiomas (CPs) share overlapping clinical, histological, and radiographic features, complicating preoperative diagnosis and treatment planning.
- We present a case that highlights the challenge of diagnosing patients with cystic suprasellar lesions which can affect management plans.
- A systematic review of similar cases identify causes and tools that may aid in preventing the misdiagnosis of RCCs and CPs.

Illustrative Case

- A 74-year-old male presented to our clinic with progressive peripheral vision loss. MRI revealed a suprasellar cystic lesion invading the anterior third ventricle and compressing the optic apparatus and pituitary infundibulum (Figure 1. A,B,C).
- The patient underwent endoscopic endonasal surgery (EEA) for cyst drainage and partial cyst wall resection/fenestration for biopsy and therapeutic management. Pathology was consistent with a diagnosis of RCC with squamous metaplasia.
- His vision improved initially, but 4 months postoperatively, the patient presented with worsening visual loss, and repeat imaging showed significant lesion regrowth (Figure 1. G,H,I).
- Repeat surgery with more aggressive cyst wall resection was performed, pathology confirming a diagnosis of papillary CP.

Methods and Materials

- A systematic review was performed using the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines.
- Using the PubMed/Medline and Cochrane Library databases, a search string was created with the keywords "Rathke cleft cyst transformation OR (Rathke cleft cyst AND craniopharyngioma) OR (RCC to craniopharyngioma) OR (Rathke cleft cyst to craniopharyngioma) OR (Rathke AND craniopharyngioma)".

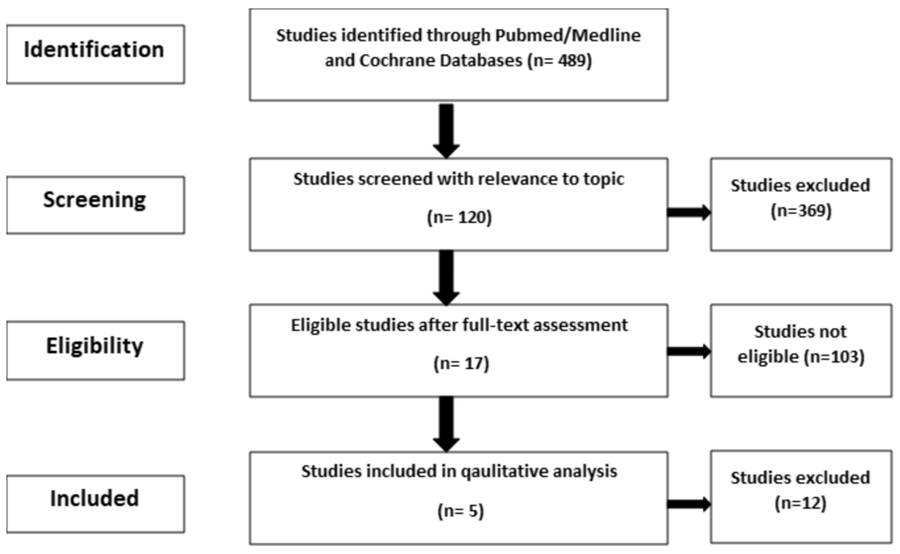

Table 1. Prisma flow diagram illustrating selection process of studies..

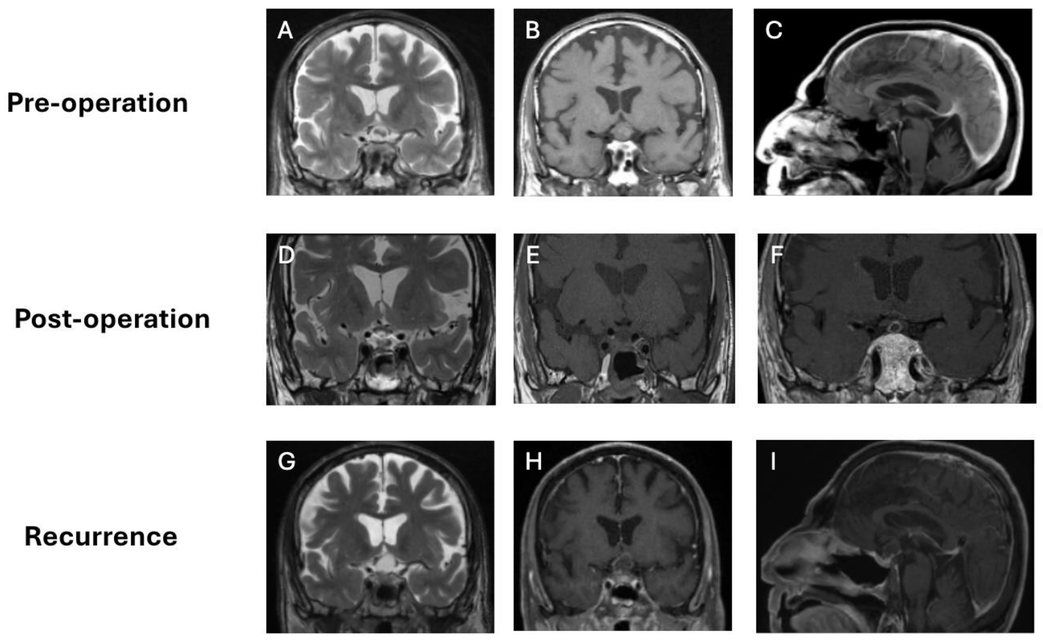

Figure 1. Pre-operative coronal T2 and T1 (A&B), and sagittal (C) CT imaging. Post-operative coronal T1 and T2 (D&E), and T1 post contrast (F) coronal CT. Coronal T1 and T2 (G&H), and post-contrast sagittal views of cyst recurrence.

Results

Supporting Study	Sex and Age	Time to recurrence (months)	Presence of SM after 1st Surgery	Diagnosis after 1st surgery	Presence of SM after 2nd Surgery	Diagnosis after 2nd surgery
Park et al. [7]	M, 41	34	No	RCC	No	ACP
Ogawa et al. [43]	M, 47	6	No	RCC	Yes	ACP
Okada et al. [44]	M, 61	3	Yes	RCC	Yes + B-catenin	CCP
Manjila et al. [19]	M, 46	1	No	RCC	NA	PCP
Sharma et al. [45]	F, 36	3	Yes	RCC	Yes + BRAF	PCP

Table 2. Prisma study results.

Discussion

- Histological differentiation of RCCs and CPs is challenging, leading to frequent misclassification.
- BRAF V600E mutation is novel to PCPs, but may be distorted by transitional RCC changes, requiring confirmatory DNA sequencing.
- Sampling bias may contribute to inaccurate diagnosis.
- Extent of resection should be weighed against risk of complications.
- P53 and Ki67 proliferation show statistically significant correlation to increased rates of CP recurrence, regardless of histopathological subtype. These biomarkers show potential as distinguishing features of CP and predicting recurrence.
- RCC with SM is considered to be a transitional phase on a spectrum from RCC to CP. Presence of SM should raise suspicion for the possibility of CP.
- Contrast-enhanced 3D T2-FLAIR MRI may help differentiate RCCs and CPs by showing promising results for identifying cyst wall enhancement in CPs.

Conclusions

RCCs and CPs share overlapping clinical, histological, and radiographic features, complicating preoperative diagnosis and treatment planning. Definitive diagnosis requires tissue for pathology evaluation. Sampling bias may present challenges in accurate diagnosis. Imaging modalities, such as contrast-enhanced 3D T2-FLAIR MRI, and biomarkers such as p53 and Ki-67, show promise in improving diagnosis, predicting recurrence, and guiding treatment.

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References