

Follicular thyroid carcinoma skull metastases

[Skull metastases](#) of extracranial origin is rare. The most common malignancies which metastasize to the skull are lung, breast, and prostate carcinomas ¹⁾. Metastases in the skull associated with carcinoma of the thyroid accounts for only 2.5%–5.8% of cases, but the initial presentation with distant metastases is rare ²⁾. Isolated metastatic tumoral nodules have a radiological feature that strongly suggests a primary tumor, and furthermore, their macroscopic appearance during surgery may even be taken for a meningioma ³⁾.

Case reports

A case who presented as isolated calvarial metastases in the form of [scalp swelling](#) and mimicked a [meningioma](#). A 60-year-old female, a known case of goiter with [hypothyroidism](#) for 10 years and receiving Eltroxin, presented to the neurosurgery outpatient department with a complaint of left-sided scalp swelling measuring 11 cm × 9 cm, associated with [headache](#) and generalized [weakness](#). There was no history of [nausea](#) and vomiting. Higher mental functions and cranial nerve examination were within normal limits. All the baseline investigations were within normal limits. Contrast-enhancing magnetic resonance imaging and computed tomography angiography showed left frontal calvarial mass approximately measuring 10 cm × 8 cm in size. Fine-needle aspiration cytology was done from the [scalp lesion](#), and it was suggestive of [secretory meningioma](#). In view of clinical and imaging findings, preoperative diagnosis of the left frontal calvarial metastases was made with differential of meningioma. Intraoperative, a tumor was identified extending from dura to both frontal bone and anterior part of the left parietal bone and causing destruction of bone. Gross total excision of the tumor was done followed by duraplasty.

On microscopy, a tumor was seen arranged in the form of well-formed back to back arranged follicles filled with colloid-like material. These tumor cells were moderately pleomorphic with round-to-oval nuclei, inconspicuous nucleoli, and moderate cytoplasm. These tumor cells were suspicious of follicular carcinoma of the thyroid. Tumor cells were seen infiltrating through the dura mater and bone. Thyroid origin was confirmed by positive immunohistochemistry for thyroid-associated antigens, i.e., thyroglobulin and thyroid transcription factor-1, confirming the diagnosis of metastatic thyroid carcinoma. Based on histopathology report, ultrasonography of the thyroid gland was done and it was suggestive of malignant lesion. Fluorodeoxyglucose (FDG) positron emission tomography scan did not show any FDG-avid lesion anywhere in the body. Postoperative period was uneventful, the patient was planned for thyroid surgery ⁴⁾

Two cases of follicular thyroid cancer with skull involvement, and describe the diagnostic and therapeutic approach to metastatic thyroid cancer. We present the cases of a 70-year-old female and a 74-year-old female who presented with painless, large slow-growing masses of the skull. The patients underwent surgical excision of the skull masses, which were histologically diagnosed as metastatic follicular thyroid cancer, and total thyroidectomy, which confirmed the diagnosis of follicular thyroid carcinoma. They were treated with radioiodine and suppressive levothyroxine, which achieved local control of the disease. Management of metastatic thyroid cancer, requires a multidisciplinary approach and multimodality treatment. Distant metastases should be surgically removed whenever possible. Initial aggressive treatment is crucial in the management of metastatic

thyroid carcinoma, providing the best chance to prolong patient survival ⁵⁾.

68-year-old female patient referred by the ophthalmology clinic with the preliminary diagnosis of retro-orbital tumor upon being admitted with proptosis. A soft tissue lesion at a size of 68 × 39 × 53 mm located intracranially was detected by the brain computerized tomography. The biopsy taken and the immunohistochemical results were not satisfactory. Intense fluorodeoxyglucose involvement was observed in both lobes of the thyroid gland at positron emission tomography/computerized tomography taken with the recommendation of the council. Moreover, hypermetabolic nodules were seen in both lung parenchyma areas, whereas intense hypermetabolic lytic lesions were observed in the skeletal system. Thyroglobulin and thyroid transcription factor 1 stains displayed a strong staining on paraffin block. On the basis of these characteristics, the case was regarded as compatible metastatic follicular thyroid carcinoma, with skull-base, cranial, retro-orbital, paranasal sinus, lung, and bone metastases. This case showed us that multidisciplinary work and assessment of the oncology council play a highly critical role in making the diagnosis and guiding the treatment ⁶⁾

A 48-year-old female patient presented with massive swelling in the frontal region of skull associated with swellings in occipital region. Evaluation confirmed that it is multiple metastases to skull bones from follicular thyroid carcinoma. This is a very rare presentation with such a large size of metastases. We report this case of a metastatic follicular thyroid carcinoma presenting as massive skull tumor at our institution ⁷⁾.

1: Lopes Rufino EP, Ribeiro da Costa Gomes ES, Silva Loureiro LM, Oliveira Eugenio P, Vaz-Guimaraes F. Brain metastases of Follicular Thyroid Carcinoma in Pregnancy: A Case Report and Literature Review. *Cureus*. 2020 Jul 22;12(7):e9337. doi: 10.7759/cureus.9337. PMID: 32850211; PMCID: PMC7445421.

2: Fan JJ, Chen Q. Chest wall metastases in postoperative thyroid cancer: a case report. *J Int Med Res*. 2019 Aug;47(8):4039-4042. doi: 10.1177/0300060519862455. Epub 2019 Aug 2. PMID: 31370731; PMCID: PMC6726781.

3: Adewale AO, Mofoluwake LA, Olamide OT, Yussuf SA. Two case reports on Mandibular metastases. *Ghana Med J*. 2018 Sep;52(3):168-172. doi: 10.4314/gmj.v52i3.11. PMID: 30602804; PMCID: PMC6303547.

4: Sheikh AB, Akhtar A, Tariq U, Sheikh AAE, Siddiqui FS, Bukhari MM. Skull metastases Extending to the Superior Sagittal Sinus: An Unfamiliar Presentation of Papillary Thyroid Carcinoma. *Cureus*. 2018 Jun 5;10(6):e2738. doi: 10.7759/cureus.2738. PMID: 30087814; PMCID: PMC6075641.

5: Hong YW, Lin JD, Yu MC, Hsu CC, Lin YS. Outcomes and prognostic factors in thyroid cancer patients with cranial metastases: A retrospective cohort study of 4,683 patients. *Int J Surg*. 2018 Jul;55:182-187. doi: 10.1016/j.ijssu.2018.06.001. Epub 2018 Jun 5. PMID: 29883619.

6: Chen Z, Qiu QH, Zhang QH, Zhu ZC, Peng Y, Liu H. [Skull base metastases from differentiated thyroid carcinoma: 3 cases report and review of literature]. *Lin Chung Er Bi Yan Hou Tou Jing Wai Ke*

Za Zhi. 2017 Jun 5;31(11):881-884. Chinese. doi: 10.13201/j.issn.1001-1781.2017.11.016. PMID: 29775008.

7: Pal P, Singh B, Kane S, Chaturvedi P. Bone Metastases in Follicular Carcinoma of Thyroid. Indian J Otolaryngol Head Neck Surg. 2018 Mar;70(1):10-14. doi: 10.1007/s12070-017-1170-x. Epub 2017 Jul 19. PMID: 29456936; PMCID: PMC5807283.

8: Pani F, Macerola E, Basolo F, Boi F, Scartozzi M, Mariotti S. Aggressive differentiated thyroid cancer with multiple metastases and NRAS and TERT promoter mutations: A case report. Oncol Lett. 2017 Aug;14(2):2186-2190. doi: 10.3892/ol.2017.6395. Epub 2017 Jun 16. PMID: 28781658; PMCID: PMC5530175.

9: Goulart CR, Upadhyay S, Ditzel Filho LFS, Beer-Furlan A, Carrau RL, Prevedello LM, Prevedello DM. Newly Diagnosed Sellar Tumors in Patients with Cancer: A Diagnostic Challenge and Management Dilemma. World Neurosurg. 2017 Oct;106:254-265. doi: 10.1016/j.wneu.2017.06.139. Epub 2017 Jun 30. PMID: 28673886.

10: Varadarajan VV, Pace EK, Patel V, Sawhney R, Amdur RJ, Dziegielewski PT. Follicular thyroid carcinoma metastases to the facial skeleton: a systematic review. BMC Cancer. 2017 Mar 28;17(1):225. doi: 10.1186/s12885-017-3199-3. PMID: 28351395; PMCID: PMC5370488.

11: Kalra R, Pawar R, Hasija S, Chandna A, Sankla M, Malhotra C. Frontal bone metastases from an occult follicular thyroid carcinoma: Diagnosed by FNAC. J Cytol. 2017 Jan-Mar;34(1):59-61. doi: 10.4103/0970-9371.197623. PMID: 28182063; PMCID: PMC5259936.

12: Pyo JY, Kim J, Choi SE, Shin E, Yang SW, Park CS, Kim SM, Hong S. Extremely Well-Differentiated Papillary Thyroid Carcinoma Resembling Adenomatous Hyperplasia Can Metastasize to the Skull: A Case Report. Yonsei Med J. 2017 Jan;58(1):255-258. doi: 10.3349/ymj.2017.58.1.255. PMID: 27873522; PMCID: PMC5122646.

13: Dong L, Huang J, Huang L, Shi O, Liu Q, Chen H, Xue W, Huang Y. Thyroid-Like Follicular Carcinoma of the Kidney in a Patient with Skull and Meningeal metastases: A Unique Case Report and Review of the Literature. Medicine (Baltimore). 2016 Apr;95(15):e3314. doi: 10.1097/MD.0000000000003314. PMID: 27082575; PMCID: PMC4839819.

14: Wong TH, Amir Hassan SZ. The use of SPECT-CT improves accuracy of post- radioiodine therapy imaging and changes the management strategy in a case of advanced follicular thyroid carcinoma. Med J Malaysia. 2015 Dec;70(6):356-7. PMID: 26988209.

15: Mishra A, Kumar C, Chand G, Agarwal G, Agarwal A, Verma AK, Mishra SK. Long- Term Outcome of Follicular Thyroid Carcinoma in Patients Undergoing Surgical Intervention for Skeletal Metastases. World J Surg. 2016 Mar;40(3):562-9. doi: 10.1007/s00268-016-3402-8. PMID: 26757717.

16: Lee HS, Yoo H, Lee SH, Gwak HS, Shin SH. Clinical characteristics and follow-up of intracranial metastases from thyroid cancer. Acta Neurochir (Wien). 2015 Dec;157(12):2185-94. doi: 10.1007/s00701-015-2611-5. Epub 2015 Oct 17. PMID: 26476828.

17: Portela RA, Choby GW, Manni A, Campbell D, Crist H, Goldenberg D. Unusual sites of metastases of papillary thyroid cancer: Case series and review of the literature. Ear Nose Throat J. 2015 Aug;94(8):E43-7. PMID: 26322457.

18: Tunio MA, Al Asiri M, Al-Qahtani KH, Aldandan S, Riaz K, Bayoumi Y. Skull base metastases from papillary thyroid carcinoma: a report of three cases. Int Med Case Rep J. 2015 Jun 25;8:127-31. doi:

10.2147/IMCRJ.S82792. PMID: 26203287; PMCID: PMC4487156.

19: Pagsisihan DA, Aguilar AH, Maningat MP. Orbital metastases as initial manifestation of a widespread papillary thyroid microcarcinoma. *BMJ Case Rep.* 2015 Mar 27;2015:bcr2014208870. doi: 10.1136/bcr-2014-208870. PMID: 25819821; PMCID: PMC4386322.

20: Chiofalo MG, Setola SV, Di Gennaro F, Fulciniti F, Catapano G, Losito NS, Sandomenico F, Catalano O, Pezzullo L. Follicular thyroid carcinoma with skull metastases. *Endocr J.* 2015;62(4):363-9. doi: 10.1507/endocrj.EJ14-0553. Epub 2015 Mar 20. PMID: 25797278.

21: Jehangir A, Pathak R, Aryal M, Qureshi A, Jehangir Q, Alweis R, Truex R, Kimmel W. Thyroid follicular carcinoma presenting as metastatic skin nodules. *J Community Hosp Intern Med Perspect.* 2015 Feb 3;5(1):26332. doi: 10.3402/jchimp.v5.26332. PMID: 25656674; PMCID: PMC4318834.

22: Altinay S, Taşkin Ü, Aydın S, Oktay MF, Özen A, Ergül N. Metastatic follicular thyroid carcinoma masquerading as olfactory neuroblastoma: with skull-base, cranium, paranasal sinus, lung, and diffuse bone metastases. *J Craniofac Surg.* 2015 Jan;26(1):e3-6. doi: 10.1097/SCS.0000000000001188. PMID: 25569410.

23: Borsò E, Boni G, Mazzarri S, Cocciaro A, Gambacciani C, Traino AC, Manca G, Grosso M, Scatena C, Ortenzi V, Vannozzi R, Marzola MC, Rubello D, Mariani G. Disseminated bone metastases from occult thyroid cancer effectively treated with debulking surgery and a single dosimetry-guided administration of radioiodine. *Rev Esp Med Nucl Imagen Mol.* 2015 Mar-Apr;34(2):111-5. doi: 10.1016/j.remn.2014.09.004. Epub 2014 Nov 6. PMID: 25455505.

24: Panda SK, Patro B, Samantaroy MR, Mishra J, Mohapatra KC, Meher RK. Unusual presentation of follicular carcinoma thyroid with special emphasis on their management. *Int J Surg Case Rep.* 2014;5(7):408-11. doi: 10.1016/j.ijscr.2014.03.006. Epub 2014 May 9. PMID: 24892246; PMCID: PMC4064430.

25: Deconde AS, Sanaiha Y, Suh JD, Bhuta S, Bergsneider M, Wang MB. Metastatic disease to the clivus mimicking clival chordomas. *J Neurol Surg B Skull Base.* 2013 Oct;74(5):292-9. doi: 10.1055/s-0033-1348027. Epub 2013 Jun 26. PMID: 24436927; PMCID: PMC3774822.

26: Winkens T, Nietzsche S, Gottschaldt M, Freesmeyer M. Nonspecific iodine accumulation in surgical suture material mimicking follicular thyroid cancer bone metastases in (131)I scintigraphy. *Clin Nucl Med.* 2014 Feb;39(2):209-10. doi: 10.1097/RLU.0000000000000297. PMID: 24368531.

27: Matsuno A, Murakami M, Hoya K, Yamada SM, Miyamoto S, Yamada S, Son JH, Nishido H, Ide F, Nagashima H, Sugaya M, Hirohata T, Mizutani A, Okinaga H, Ishii Y, Tahara S, Teramoto A, Osamura RY, Yamazaki K, Ishida Y. Clinicopathological and molecular histochemical review of skull base metastases from differentiated thyroid carcinoma. *Acta Histochem Cytochem.* 2013 Oct 30;46(5):129-36. doi: 10.1267/ahc.13019. Epub 2013 Oct 25. PMID: 24194626; PMCID: PMC3813819.

28: Koppad SN, Kapoor VB. Follicular thyroid carcinoma presenting as massive skull metastases: a rare case report and literature review. *J Surg Tech Case Rep.* 2012 Jul;4(2):112-4. doi: 10.4103/2006-8808.110252. PMID: 23741589; PMCID: PMC3673353.

29: Bhansali A, Shanmugasundar G, Walia R, Dutta P, Rajwanshi A, Gupta N. Follicular thyroid carcinoma with pulsatile osseous metastases. *BMJ Case Rep.* 2012 Jan 10;2012:bcr0920103354. doi: 10.1136/bcr.09.2010.3354. PMID: 22665706; PMCID: PMC4543041.

- 30: Tazi el M, Essadi I, Errihani H. Thyroid carcinoma presenting as a dural metastases mimicking a meningioma: A case report. *N Am J Med Sci*. 2011 Jan;3(1):39-42. doi: 10.4297/najms.2011.339. PMID: 22540062; PMCID: PMC3336932.
- 31: [Metastasizing of follicular thyroid cancer to the skull base]. *Zh Vopr Neirokhir Im N N Burdenko*. 2011;75(4):75-81. Russian. PMID: 22379856.
- 32: Matsuno A, Katakami H, Okazaki R, Yamada S, Sasaki M, Nakaguchi H, Yamada SM, Hoya K, Murakami M, Yamazaki K, Ishida Y, Iwasaki H, Kuyama J, Kakudo K. Skull base metastases from follicular thyroid carcinoma -two case reports-. *Neurol Med Chir (Tokyo)*. 2010;50(5):421-5. doi: 10.2176/nmc.50.421. PMID: 20505304.
- 33: Rahman GA, Abdulkadir AY, Olatoke SA, Yusuf IF, Braimoh KT. Unusual cutaneous metastatic follicular thyroid carcinoma. *J Surg Tech Case Rep*. 2010 Jan;2(1):35-8. doi: 10.4103/2006-8808.63724. PMID: 22091330; PMCID: PMC3214490.
- 34: Portocarrero-Ortiz L, Garcia-Lopez R, Romero-Vargas S, Padilla JA, Gómez- Amador JL, Salinas-Lara C, Tena-Suck ML, González AS. Thyroid follicular carcinoma presenting as skull and dural metastases mimicking a meningioma: a case report. *J Neurooncol*. 2009 Nov;95(2):281-284. doi: 10.1007/s11060-009-9915-3. Epub 2009 May 17. PMID: 19449147.
- 35: Cardenas MG, Kini S, Wisgerhof M. Two patients with highly aggressive macrofollicular variant of papillary thyroid carcinoma. *Thyroid*. 2009 Apr;19(4):413-6. doi: 10.1089/thy.2008.0178. PMID: 19355832.
- 36: Sisson JC, Dewaraja YK, Wizauer EJ, Giordano TJ, Avram AM. Thyroid carcinoma metastases to skull with infringement of brain: treatment with radioiodine. *Thyroid*. 2009 Mar;19(3):297-303. doi: 10.1089/thy.2008.0426. PMID: 19207003; PMCID: PMC2727798.
- 37: Coca Pelaz A, Llorente JL, Suárez C. Infratemporal metastases from occult follicular thyroid carcinoma. *J Craniofac Surg*. 2009 Jan;20(1):165-7. doi: 10.1097/SCS.0b013e318191cec0. PMID: 19165017.
- 38: Shamim MS, Khursheed F, Bari ME, Chisti KN, Enam SA. Follicular thyroid carcinoma presenting as solitary skull metastases: report of two cases. *J Pak Med Assoc*. 2008 Oct;58(10):575-7. PMID: 18998315.
- 39: Lu J, Frater JL, Kreisel FH, Marcus JN, Hassan A. Secondary lymphoma involving metastatic follicular thyroid carcinoma to the skull: a unique example of tumor-to-tumor metastases. *Head Neck Pathol*. 2008 Sep;2(3):209-12. doi: 10.1007/s12105-008-0051-8. Epub 2008 Apr 22. PMID: 20614316; PMCID: PMC2807566.
- 40: Mydlarz WK, Wu J, Aygun N, Olivi A, Carey JP, Westra WH, Tufano RP. Management considerations for differentiated thyroid carcinoma presenting as a metastases to the skull base. *Laryngoscope*. 2007 Jul;117(7):1146-52. doi: 10.1097/MLG.0b013e318058192e. PMID: 17489069.
- 41: Miyawaki S, Yamazaki R, Harada T, Takanashi S, Nagashima T, Nakaguchi H, Okazaki R, Yamazaki K, Ishida Y, Matsuno A. Skull metastases of thyroid papillary carcinoma. *J Clin Neurosci*. 2007 May;14(5):481-4. doi: 10.1016/j.jocn.2006.01.032. PMID: 17386370.
- 42: Ogawa Y, Sugawara T, Seki H, Sakuma T. Thyroid follicular carcinoma metastasized to the lung, skull, and brain 12 years after initial treatment for thyroid gland-case report. *Neurol Med Chir (Tokyo)*. 2006 Jun;46(6):302-5. doi: 10.2176/nmc.46.302. PMID: 16794352.

- 43: dos Santos VM, Corr ea FG, Barbosa Junior ER, Leal M. Thyroid cancer with skull enlargement: a lesson learned? *Asian Pac J Cancer Prev*. 2005 Oct- Dec;6(4):563-4. PMID: 16436013.
- 44: Akdemir I, Erol FS, Akpolat N, Ozveren MF, Akfirat M, Yahsi S. Skull metastases from thyroid follicular carcinoma with difficult diagnosis of the primary lesion. *Neurol Med Chir (Tokyo)*. 2005 Apr;45(4):205-8. doi: 10.2176/nmc.45.205. PMID: 15849459.
- 45: Nggada HA, Gali BM, Khalil MI. Post-thyroidectomy metastatic thyroid cancer. *Niger J Med*. 2005 Jan-Mar;14(1):92-4. doi: 10.4314/njm.v14i1.37143. PMID: 15832651.
- 46: Kelessis NG, Prassas EP, Dascalopoulou DV, Apostolikas NA, Tavernaraki AP, Vassilopoulos P PP. Unusual metastatic spread of follicular thyroid carcinoma: report of a case. *Surg Today*. 2005;35(4):300-3. doi: 10.1007/s00595-004-2922-2. Erratum in: *Surg Today*. 2005;35(6):505. Evangelos, Prassas P [corrected to Prassas, Evangelos P]; Dimitra, Dascalopoulou V [corrected to Dascalopoulou, Dimitra V]; Nikiforos, Apostolikas A [corrected to Apostolikas, Nikiforos A]; Angeliki, Tavernaraki P [corrected to Tavernaraki, Angeliki P]; Pe. PMID: 15815846.
- 47: Ozdemir N, Seno lu M, Acar UD, Canda MS. Skull metastases of follicular thyroid carcinoma. *Acta Neurochir (Wien)*. 2004 Oct;146(10):1155-8; discussion 1158. doi: 10.1007/s00701-004-0290-8. PMID: 15744853.
- 48: Simon N, Quyyumi SA, Rothman JG. Follicular thyroid cancer presenting as a sellar mass: case report and review of the literature. *Endocr Pract*. 2004 Jan- Feb;10(1):62-6. doi: 10.4158/EP.10.1.62. PMID: 15251624.
- 49: Yilmazlar S, Kocaeli H, Cordan T. Sella turcica metastases from follicular carcinoma of thyroid. *Neurol Res*. 2004 Jan;26(1):74-8. doi: 10.1179/016164104773026561. PMID: 14977061.
- 50: Devaney KO, Ferlito A, Rinaldo A. Endolymphatic sac tumor (low-grade papillary adenocarcinoma) of the temporal bone. *Acta Otolaryngol*. 2003 Dec;123(9):1022-6. doi: 10.1080/00016480310000494. PMID: 14710902.
- 51: Chakroborty DK, Bhattacharjee PK, Ray D, Haldar S. Follicular carcinoma of thyroid with synchronous bony and soft tissue metastases. *J Indian Med Assoc*. 2003 May;101(5):316-7. PMID: 14575223.
- 52: de Keizer B, Brans B, Hoekstra A, Zelissen PM, Koppeschaar HP, Lips CJ, van Rijk PP, Dierckx RA, de Klerk JM. Tumour dosimetry and response in patients with metastatic differentiated thyroid cancer using recombinant human thyrotropin before radioiodine therapy. *Eur J Nucl Med Mol Imaging*. 2003 Mar;30(3):367-73. doi: 10.1007/s00259-002-1076-y. Epub 2002 Dec 19. PMID: 12634964.
- 53: Wong GK, Boet R, Poon WS, Ng HK. Lytic skull metastases secondary to thyroid carcinoma in an adolescent. *Hong Kong Med J*. 2002 Apr;8(2):149-51. PMID: 11937672.
- 54: Giovanni V, Arianna LG, Antonio C, Francesco F, Michele K, Giovanni S, Marco S, Giovanni L. The use of recombinant human TSH in the follow-up of differentiated thyroid cancer: experience from a large patient cohort in a single centre. *Clin Endocrinol (Oxf)*. 2002 Feb;56(2):247-52. doi: 10.1046/j.0300-0664.2001.01425.x. PMID: 11874417.
- 55: Schirrmeister H, Buck A, Guhlmann A, Reske SN. Anatomical distribution and sclerotic activity of bone metastases from thyroid cancer assessed with F-18 sodium fluoride positron emission

tomography. *Thyroid*. 2001 Jul;11(7):677-83. doi: 10.1089/105072501750362754. PMID: 11484897.

56: Luster M, Reinhardt W, Korber C, Lassmann M, Haenscheid H, Michalowski U, Rendl J, Eising E, Mann K, Reiners C. The use of recombinant human TSH in a patient with metastatic follicular carcinoma and insufficient endogenous TSH production. *J Endocrinol Invest*. 2000 Jul-Aug;23(7):473-5. doi: 10.1007/BF03343758. PMID: 11005273.

57: Rosahl SK, Erpenbeck V, Vorkapic P, Samii M. Solitary follicular thyroid carcinoma of the skull base and its differentiation from ectopic adenoma- review, use of galectin-3 and report of a new case. *Clin Neurol Neurosurg*. 2000 Sep;102(3):149-55. doi: 10.1016/s0303-8467(00)00088-3. PMID: 10996713.

58: Lin JD, Chan EC, Chao TC, Chen KT, Hsueh C, Ho YS, Weng HF. Expression of sodium iodide symporter in metastatic and follicular human thyroid tissues. *Ann Oncol*. 2000 May;11(5):625-9. doi: 10.1023/a:1008340402577. PMID: 10907960.

59: Siegel E. The beginnings of radioiodine therapy of metastatic thyroid carcinoma: a memoir of Samuel M. Seidlin, M. D. (1895-1955) and his celebrated patient. *Cancer Biother Radiopharm*. 1999 Apr;14(2):71-9. doi: 10.1089/cbr.1999.14.71. PMID: 10850290.

60: Conzo G, Caracò C, D'Arco E, Giordano A, Amore A, D'Ardis A, De Rosa G, Santini L. Metastasi della teca cranica da carcinoma follicolare della tiroide. Descrizione di un caso clinico e review della letteratura [Cranial metastases from a follicular carcinoma of the thyroid. A clinical case report and review of the literature]. *Minerva Chir*. 1998 Sep;53(9):751-6. Italian. PMID: 9866945.

61: Kim SH, Kosnik E, Madden C, Morran S, Rusin J, Gordon T, Boue D. Lytic skull metastases from a follicular thyroid carcinoma in a child. *Pediatr Neurosurg*. 1998 Feb;28(2):84-8. doi: 10.1159/000028626. PMID: 9693337.

62: Inci S, Akbay A, Bertan V, Gedikoğlu G, Onol B. Solitary skull metastases from occult thyroid carcinoma. *J Neurosurg Sci*. 1994 Mar;38(1):63-6. PMID: 7965145.

63: Tenenbaum F, Schlumberger M, Bonnin F, Lumbroso J, Aubert B, Benali H, Parmentier C. Usefulness of technetium-99m hydroxymethylene diphosphonate scans in localizing bone metastases of differentiated thyroid carcinoma. *Eur J Nucl Med*. 1993 Dec;20(12):1168-74. doi: 10.1007/BF00171015. PMID: 8299652.

64: Tokuda Y, Hatayama T, Sakoda K. metastases of malignant struma ovarii to the cranial vault during pregnancy. *Neurosurgery*. 1993 Sep;33(3):515-8. doi: 10.1227/00006123-199309000-00025. PMID: 8413886.

65: Kearns DB, Robinson LD, Wright GL, Wickersham JK, Parke RB Jr. Skull metastases from follicular thyroid carcinoma. *Arch Otolaryngol Head Neck Surg*. 1988 Apr;114(4):454-6. doi: 10.1001/archotol.1988.01860160098030. PMID: 3348903.

66: Tovi F, Leiberman A, Hirsch M. Uncommon clinical manifestations in a case of thyroid carcinoma. *Head Neck Surg*. 1984 May-Jun;6(5):974-7. doi: 10.1002/hed.2890060512. PMID: 6724962.

67: Aiyoshi Y, Ogata E. Report on a case of functioning thyroid carcinoma provoking thyrotoxicosis with review of literature. *Endocrinol Jpn*. 1978 Dec;25(6):623-9. doi: 10.1507/endocrj1954.25.623. PMID: 751808.

68: Adeloye A, Odeku EL, Williams AO. Metastatic tumours of the brain and its enveloping structures in Ibadan, Nigeria. *Afr J Med Med Sci*. 1976 Sep;5(3):181-4. PMID: 829726.

69: Boehm T, Rothhouse L, Wartofsky L. Metastatic occult follicular thyroid carcinoma. JAMA. 1976 May 31;235(22):2420-1. PMID: 946653.

70: Strangmeier JM. A singular large skull metastases from follicular thyroid carcinoma in a Mountaingyard female. Ariz Med. 1973 Jun;30(6):409-10. PMID: 4711140.

71: Vieira Filho JP, Consentino E, Tatit ED. Metástases funcionantes de carcinoma folicular da tireóide. Apresentação de um caso [Active metastases of follicular carcinoma of the thyroid. Presentation of a case]. AMB Rev Assoc Med Bras. 1969 May;15(5):219-22. Portuguese. PMID: 5307354.

1)

McCormack KR. Bone metastases from thyroid carcinoma. Cancer 1966;19:181-4.

2)

Turner O, German WJ. Metastases in the skull from carcinoma of the thyroid. Surgery 1941;9:403-14.

3)

Tagle P, Villanueva P, Torrealba G, Huete I. Intracranial metastases or meningioma? An uncommon clinical diagnostic dilemma. Surg Neurol 2002;58:241-5

4)

Singh V, Singh A, Bhadada SK, Nada R. Isolated dural metastases of follicular carcinoma of the thyroid presenting as scalp swelling. J Cancer Res Ther. 2020 Dec;16(Supplement):S248-S249. doi: 10.4103/jcrt.JCRT_461_18. PMID: 33380691.

5)

Chiofalo MG, Setola SV, Di Gennaro F, Fulciniti F, Catapano G, Losito NS, Sandomenico F, Catalano O, Pezzullo L. Follicular thyroid carcinoma with skull metastases. Endocr J. 2015;62(4):363-9. doi: 10.1507/endocrj.EJ14-0553. Epub 2015 Mar 20. PMID: 25797278.

6)

Altinay S, Taşkin Ü, Aydın S, Oktay MF, Özen A, Ergül N. Metastatic follicular thyroid carcinoma masquerading as olfactory neuroblastoma: with skull-base, cranium, paranasal sinus, lung, and diffuse bone metastases. J Craniofac Surg. 2015 Jan;26(1):e3-6. doi: 10.1097/SCS.0000000000001188. PMID: 25569410.

7)

Koppad SN, Kapoor VB. Follicular thyroid carcinoma presenting as massive skull metastases: a rare case report and literature review. J Surg Tech Case Rep. 2012 Jul;4(2):112-4. doi: 10.4103/2006-8808.110252. PMID: 23741589; PMCID: PMC3673353.

From:

<https://neurosurgerywiki.com/wiki/> - **Neurosurgery Wiki**

Permanent link:

https://neurosurgerywiki.com/wiki/doku.php?id=follicular_thyroid_carcinoma_skull_metastases

Last update: **2024/06/07 02:52**

