

Astrocitoma pilocítico

Tumor neuroepitelial circunscrito, grado 1 en la [clasificación de la OMS](#).

Epidemiología

Es un tipo común de tumor cerebral en la población pediátrica, ya que forman un 19,1% de todos los tumores cerebrales pediátricos en el grupo de 0 - 14 años. [Last accessed on 2012 Mar 23]. Available from: <http://www.cbtrus.org/reports/reports.html>, y son los tumores de cerebelo más frecuentes en niños (Burger y col., 2000; Farwell y col., 1977).

Pueden afectar a todo el neuroeje, pero el [cerebelo](#) es el sitio más común de origen.

El 15 % de los pacientes con [neurofibromatosis tipo 1](#) desarrollan un astrocitoma pilocítico.

Localización

85 % se encuentran [infratentoriales](#) y 15 % [supratentoriales](#).

Si bien esta neoplasia puede localizarse en cualquier topografía del neuroeje, ocurre más comunmente en el [cerebelo](#), [nervio óptico](#), la región hipotálamo-quiasmática, [mesencefálica](#).

La localización en [ganglios basales](#) es menos habitual.

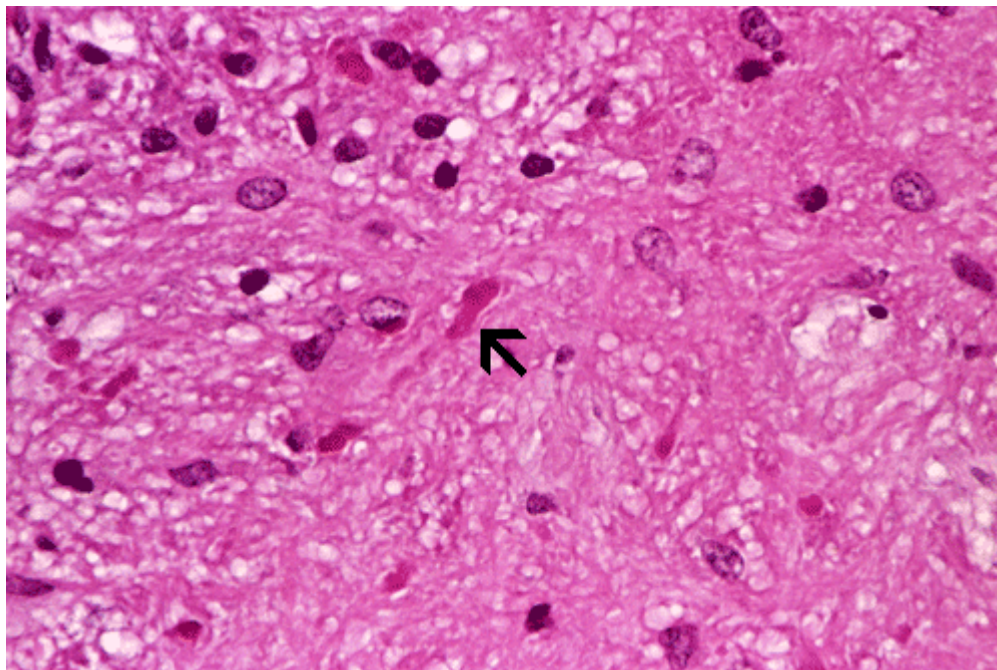
[Astrocitoma pilocítico de cerebelo](#).

[Astrocitoma pilocítico de nervio óptico](#).

[Astrocitoma pilocítico hipotalámico](#).

[Astrocitoma pilocítico medular](#).

Anatomía Patológica



El estudio de estos tumores plantea la dificultad de poder definir los criterios mínimos diagnósticos para el diagnóstico de la entidad.

Varios grupos han reportado una serie de tumores astrocíticos con características comunes a los astrocitomas pilocíticos pero con algunas notables diferencias que justifican su análisis por separado.

Esencialmente, estas neoplasias exhiben una patente monomorfa que ha sido llamada pilomixoide y predomina una densa trama de fibrillas gliales con abundantes fibras de Rosenthal.

La presencia de proliferación vascular en la histopatología son hallazgos posibles en el astrocitoma pilocítico, y al contrario que en otros gliomas, no son indicativos de malignidad.

Se ha descrito un Glioma Metacrónico, multicéntrico de astrocitoma pilocítico con componente de oligodendroglioma a través de distintas aberraciones genéticas (Kanoke y col., 2012).

Se sospecha que puede haber casos previamente diagnosticados de astrocitoma pilocítico y que en realidad son tumores neuroepiteliales disembrionarios y en cualquier caso, en presencia de un tumor cerebeloso con características de astrocitoma pilocítico, la posibilidad de una variante compleja de tumor neuroepitelial disembrionario se debería tener en cuenta (Vaquero y col., 2012).

Heterogeneidad molecular

La vía de señalización de las [proteínas quinasas activadas por mitógenos MAPK](#), es crítica para su formación.

El gen BRAF se encuentra situado en el brazo largo del cromosoma 7 (7q34) y codifica una quinasa serina/treonina citoplasmática de la familia RAF que, al igual que RAS, RET y TRK es miembro esencial de la ruta de señalización de proteínas quinasas activadas por mitógenos (MAPK).

La pérdida del gen NF1 permite la hiperactivación del [oncogén K-RAS](#) (Sadighi y col., 2013).

Clínica

Tiene un curso clínico relativamente indolente.

Diagnóstico



En la resonancia magnética, es habitualmente un tumor sólido-quístico bien delimitado, iso-hipointensas en ponderación T1 e hiperintensas en ponderación T2.

Tienen realce intenso pero heterogéneo.

Diagnóstico diferencial

El astrocitoma pilocítico puede tener un componente de like-oligodendroglioma, sin embargo, el diagnóstico diferencial de los oligodendrogliomas puede ser difícil cuando este componente es mayoritario en el tumor. El astrocitoma pilocítico es inmunoreactivo a la GFAP y Olig2, pero no a la Sinaptofisina, EMA, o IDH 1 (Utsuki y col., 2011).

Tratamiento

Según los casos, el seguimiento clínico y radiológico de la lesión puede ser razonable. La cirugía puede ser curativa si se consigue una resección completa del tumor.

La radioterapia adyuvante después de cirugía puede ser necesaria en los pacientes de más edad, con resecciones incompletas o con otros factores de riesgo.

Pronóstico

Existen reportes recientes que mencionan la diseminación por el líquido cefalorraquídeo (LCR) implantes espinales y evolución anaplásica.

Sin embargo, estos desarrollos son excepcionales y el pronóstico global de los pacientes es bueno con sobrevivencias del 80 al 100% a los 10 años.

De los análisis preliminares de supervivencia surge la impresión que estos tumores tienen una tasa de recurrencia y diseminación por el LCR mayor que la de los astrocitomas pilocíticos convencionales.

Bibliografía

Burger PC, Scheithauer BW, Paulus W, Szymas J, Giannini C, Kleihues P. Pathology and genetics of tumours of the nervous system. Lyon: IARC; 2000. pp. 45-51.

Farwell JR, Dohrmann GJ, Flannery JT. Central nervous system tumors in children. Cancer. 1977;40:3123-32.

Kanoke, Atsushi, Masayuki Kanamori, Toshihiro Kumabe, Ryuta Saito, Mika Watanabe, and Teiji Tominaga. 2012. "Metachronous, Multicentric Glioma of Pilocytic Astrocytoma with Oligodendroglioma-like Component and Oligodendroglioma Through Distinct Genetic Aberrations." Journal of Neurosurgery (October 19). doi:10.3171/2012.9.JNS112353.

Sadighi, Zsila, and John Slopis. 2013. "Pilocytic Astrocytoma: A Disease With Evolving Molecular Heterogeneity." Journal of Child Neurology (February 25). doi:10.1177/0883073813476141.

Utsuki, Satoshi, Hidehiro Oka, Chihiro Kijima, Yoshie Yasui, Kiyotaka Fujii, and Nobuyuki Kawano. 2011. "Pilocytic astrocytoma with abundant oligodendroglioma-like component." Brain Tumor Pathology (December 28). doi:10.1007/s10014-011-0074-9. <http://www.ncbi.nlm.nih.gov/pubmed/22203030>.

Vaquero, Jesús, Cristobal Saldaña, Santiago Coca, and Mercedes Zurita. 2012. "Complex Form Variant of Dysembryoplastic Neuroepithelial Tumor of the Cerebellum." Case Reports in Pathology 2012. doi:10.1155/2012/718651. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3440858/>.

Bibliografía recomendada

1: Utsuki S, Oka H, Kijima C, Yasui Y, Fujii K, Kawano N. Pilocytic astrocytoma with abundant oligodendroglioma-like component. Brain Tumor Pathol. 2011 Dec 28. [Epub ahead of print] PubMed PMID: 22203030.

2: Zhou J, Yang GY. [Pediatric pilocytic astrocytoma with monomorphous pilomyxoid features and plexiform pattern: report of a case]. Zhonghua Bing Li Xue Za Zhi. 2011 Aug;40(8):565-6. Chinese. PubMed PMID: 22169652.

3: Kim YE, Shin HJ, Suh YL. Pilocytic astrocytoma with extensive psammomatous calcification in the lateral ventricle: a case report. Childs Nerv Syst. 2011 Dec 14. [Epub ahead of print] PubMed PMID: 22167267.

- 4: Jones DT, Gronych J, Lichter P, Witt O, Pfister SM. MAPK pathway activation in pilocytic astrocytoma. *Cell Mol Life Sci*. 2011 Dec 13. [Epub ahead of print] PubMed PMID: 22159586.
- 5: Harraher CD, Vogel H, Steinberg GK. Spinal Pilocytic Astrocytoma in an Elderly Patient. *World Neurosurg*. 2011 Nov 1. [Epub ahead of print] PubMed PMID: 22120566.
- 6: Jusué-Torres I, Alcázar-Vaquerizo L, Gómez-Angulo JC, Navarro-Torres R, López-Serrano R, García-Miralles N. [Leptomeningeal spread of an intramedullary cervical pilocytic astrocytoma: case report and literature review]. *Neurocirugia (Astur)*. 2011 Oct;22(5):445-51; discussion 452. Spanish. PubMed PMID: 22031164.
- 7: Umredkar A, Gupta SK, Radotra B. Posterior fossa vermian cystic schwannoma mimicking as pilocytic astrocytoma: a case report and literature review. *Neurol India*. 2011 Sep-Oct;59(5):756-60. PubMed PMID: 22019665.
- 8: Hallemeier CL, Pollock BE, Schomberg PJ, Link MJ, Brown PD, Stafford SL. Stereotactic Radiosurgery for Recurrent or Unresectable Pilocytic Astrocytoma. *Int J Radiat Oncol Biol Phys*. 2011 Oct 20. [Epub ahead of print] PubMed PMID: 22019245.
- 9: Shibao S, Kimura T, Sasaki H, Fujiwara H, Akiyama T, Ueno M, Shidoh S, Yoshida K. Hemorrhagic onset of cerebellar pilocytic astrocytoma in an adult: a case report and review of the literature implying a possible relation of degenerative vascular changes to the massive intratumoral hemorrhage. *Brain Tumor Pathol*. 2011 Oct 19. [Epub ahead of print] PubMed PMID: 22009025.
- 10: Masruha MR, Fialho LM, da Nóbrega MV, Lin J, Pinho RS, Cavalheiro S, Vilanova LC. Hemifacial spasm as a manifestation of pilocytic astrocytoma in a pediatric patient. *J Pediatr Neurosci*. 2011 Jan;6(1):72-3. PubMed PMID: 21977096; PubMed Central PMCID: PMC3173923.
- 11: Nishimoto T, Iida K, Kagawa K, Watanabe Y, Kiura Y, Hashizume A, Sugiyama K, Kurisu K. Late recurrence of intractable epilepsy associated with MRI-occult pilocytic astrocytoma in the temporal lobe nine years after initial removal: a case report with surgical and late-seizure recurrence observations. *Hiroshima J Med Sci*. 2011 Jun;60(2):45-9. PubMed PMID: 21970188.
- 12: Bulstrode H, Ditchfield A, Nicoll J, Shenouda E. Pilocytic astrocytoma originating at the cavernous sinus. *Acta Neurochir (Wien)*. 2011 Sep 3. [Epub ahead of print] PubMed PMID: 21892636.
- 13: Yoshida Y, Tsukada T, Hashimoto M, Hayashi Y. [Pilocytic astrocytoma of the cerebrum presenting in an elderly patient: a case report]. *No Shinkei Geka*. 2011 Sep;39(9):865-9. Japanese. PubMed PMID: 21873741.
- 14: Murray RD, Penar PL, Filippi CG, Tarasiewicz I. Radiographically distinct variant of pilocytic astrocytoma: a case series. *J Comput Assist Tomogr*. 2011 Jul-Aug;35(4):495-7. PubMed PMID: 21765308.
- 15: Redhu R, Nadkarni TD. Multicompartmental cerebrospinal fluid dissemination of cerebellar pilocytic astrocytoma at presentation. *J Clin Neurosci*. 2011 Oct;18(10):1412-4. Epub 2011 Jul 20. PubMed PMID: 21764319.
- 16: Deshmukh H, Yu J, Shaik J, MacDonald TJ, Perry A, Payton JE, Gutmann DH, Watson MA, Nagarajan R. Identification of transcriptional regulatory networks specific to pilocytic astrocytoma. *BMC Med Genomics*. 2011 Jul 11;4:57. PubMed PMID: 21745356; PubMed Central PMCID: PMC3200988.
- 17: Oukabli M, Elmostarchid B, Akhaddar A, Ennouali E, Zoubir Y, Belhachmi A, Boucetta M,

Abderrahmane A. Concomitant Intramedullary Pilocytic Astrocytoma and Conus Medullaris Myxopapillary Ependymoma: A Case Report. *Cen Eur Neurosurg*. 2011 Jun 17. [Epub ahead of print] PubMed PMID: 21688235.

18: Yang I, Han SJ, Sughrue ME, Tihan T, Parsa AT. Immune cell infiltrate differences in pilocytic astrocytoma and glioblastoma: evidence of distinct immunological microenvironments that reflect tumor biology. *J Neurosurg*. 2011 Sep;115(3):505-11. Epub 2011 Jun 10. PubMed PMID: 21663411.

19: Raabe EH, Lim KS, Kim JM, Meeker A, Mao XG, Nikkhah G, Maciaczyk J, Kahlert U, Jain D, Bar E, Cohen KJ, Eberhart CG. BRAF activation induces transformation and then senescence in human neural stem cells: a pilocytic astrocytoma model. *Clin Cancer Res*. 2011 Jun 1;17(11):3590-9. PubMed PMID: 21636552.

20: Peters KB, Cummings TJ, Gururangan S. Transformation of juvenile pilocytic astrocytoma to anaplastic pilocytic astrocytoma in patients with neurofibromatosis type I. *J Pediatr Hematol Oncol*. 2011 Jul;33(5):e198-201. PubMed PMID: 21572348.

21: Tsuda K, Ishikawa E, Saito A, Satomi K, Sakata A, Takano S, Morishita Y, Noguchi M, Matsumura A. Primary cerebellar pilocytic astrocytoma with anaplastic features in a patient with neurofibromatosis type 1 - case report - . *Neurol Med Chir (Tokyo)*. 2011;51(4):315-8. PubMed PMID: 21515958.

22: Anagnostopoulos AK, Dimas KS, Papathanassiou C, Braoudaki M, Anastasiadou E, Vougas K, Karamolegou K, Kontos H, Prodromou N, Tzortzatou-Stathopoulou F, Tsangaris GT. Proteomics studies of childhood pilocytic astrocytoma. *J Proteome Res*. 2011 May 6;10(5):2555-65. Epub 2011 Apr 14. PubMed PMID: 21466243.

23: Metellus P, Voutsinos-Porche B, Nanni-Metellus I, Colin C, Fina F, Berenguer C, Dussault N, Boudouresque F, Loundou A, Intagliata D, Chinot O, Martin PM, Figarella-Branger D, Ouafik L. Adrenomedullin expression and regulation in human glioblastoma, cultured human glioblastoma cell lines and pilocytic astrocytoma. *Eur J Cancer*. 2011 Jul;47(11):1727-35. Epub 2011 Mar 31. PubMed PMID: 21458987.

24: Cin H, Meyer C, Herr R, Janzarik WG, Lambert S, Jones DT, Jacob K, Benner A, Witt H, Remke M, Bender S, Falkenstein F, Van Anh TN, Olbrich H, von Deimling A, Pekrun A, Kulozik AE, Gnekow A, Scheurlen W, Witt O, Omran H, Jabado N, Collins VP, Brummer T, Marschalek R, Lichter P, Korshunov A, Pfister SM. Oncogenic FAM131B-BRAF fusion resulting from 7q34 deletion comprises an alternative mechanism of MAPK pathway activation in pilocytic astrocytoma. *Acta Neuropathol*. 2011 Jun;121(6):763-74. Epub 2011 Mar 20. PubMed PMID: 21424530.

25: Gronych J, Korshunov A, Bageritz J, Milde T, Jugold M, Hambardzumyan D, Remke M, Hartmann C, Witt H, Jones DT, Witt O, Heiland S, Bendszus M, Holland EC, Pfister S, Lichter P. An activated mutant BRAF kinase domain is sufficient to induce pilocytic astrocytoma in mice. *J Clin Invest*. 2011 Apr 1;121(4):1344-8. doi: 10.1172/JCI44656. Epub 2011 Mar 14. PubMed PMID: 21403401; PubMed Central PMCID: PMC3069779.

26: Ishkanian A, Laperriere NJ, Xu W, Millar BA, Payne D, Mason W, Sahgal A. Upfront observation versus radiation for adult pilocytic astrocytoma. *Cancer*. 2011 Sep 1;117(17):4070-9. doi: 10.1002/cncr.25988. Epub 2011 Mar 9. PubMed PMID: 21391213.

27: Shibahara I, Kawaguchi T, Kanamori M, Yonezawa S, Takazawa H, Asano K, Ohkuma H, Kaimori M, Sasaki T, Nishijima M. Pilocytic astrocytoma with histological malignant features without previous radiation therapy-case report. *Neurol Med Chir (Tokyo)*. 2011;51(2):144-7. PubMed PMID: 21358161.

- 28: Privett BJ, Liubinas SV, Tsui A, Gonzales M, Lo P. Pilocytic astrocytoma with neoplastic gemistocytes undergoing spontaneous transformation to glioblastoma multiforme without prior radiotherapy. *J Clin Neurosci*. 2011 May;18(5):705-7. Epub 2011 Feb 23. PubMed PMID: 21349721.
- 29: Kurwale NS, Suri V, Suri A, Sarkar C, Gupta DK, Sharma BS, Mahapatra AK. Predictive factors for early symptomatic recurrence in pilocytic astrocytoma: does angiogenesis have a role to play? *J Clin Neurosci*. 2011 Apr;18(4):472-7. Epub 2011 Feb 2. PubMed PMID: 21292490.
- 30: Schindler G, Capper D, Meyer J, Janzarik W, Omran H, Herold-Mende C, Schmieder K, Wesseling P, Mawrin C, Hasselblatt M, Louis DN, Korshunov A, Pfister S, Hartmann C, Paulus W, Reifenberger G, von Deimling A. Analysis of BRAF V600E mutation in 1,320 nervous system tumors reveals high mutation frequencies in pleomorphic xanthoastrocytoma, ganglioglioma and extra-cerebellar pilocytic astrocytoma. *Acta Neuropathol*. 2011 Mar;121(3):397-405. Epub 2011 Jan 29. PubMed PMID: 21274720.
- 31: Kato K, Moteki Y, Nakagawa M, Kadoyama S, Ujiie H. Subarachnoid hemorrhage caused by pilocytic astrocytoma—case report. *Neurol Med Chir (Tokyo)*. 2011;51(1):82-4. PubMed PMID: 21273754.
- 32: Sakai K, Miyahara T, Tsutsumi K, Kaneko T, Fukushima M, Tanaka Y, Hongo K. Spontaneous regression of multicentric pilocytic astrocytoma with CSF dissemination in an adult. *Brain Tumor Pathol*. 2011 Apr;28(2):151-6. Epub 2011 Jan 6. PubMed PMID: 21210237.
- 33: Sikkema AH, de Bont ES, Molema G, Dimberg A, Zwiers PJ, Diks SH, Hoving EW, Kamps WA, Peppelenbosch MP, den Dunnen WF. Vascular endothelial growth factor receptor 2 (VEGFR-2) signalling activity in paediatric pilocytic astrocytoma is restricted to tumour endothelial cells. *Neuropathol Appl Neurobiol*. 2011 Aug;37(5):538-48. doi: 10.1111/j.1365-2990.2011.01160.x. PubMed PMID: 21208252.
- 34: AlShakweer W, Alwelaie Y, Mankung AM, Graeber MB. Bone marrow-derived microglia in pilocytic astrocytoma. *Front Biosci (Elite Ed)*. 2011 Jan 1;3:371-9. PubMed PMID: 21196317.
- 35: Eisenhardt AE, Olbrich H, Röring M, Janzarik W, Anh TN, Cin H, Remke M, Witt H, Korshunov A, Pfister SM, Omran H, Brummer T. Functional characterization of a BRAF insertion mutant associated with pilocytic astrocytoma. *Int J Cancer*. 2010 Dec 28. doi: 10.1002/ijc.25893. [Epub ahead of print] PubMed PMID: 21190184.
- 36: Kumar A, Deopujari CE, Biyani N, Mhatre MV. Pediatric cerebellar pilocytic astrocytoma presenting with hemorrhage. *Neurol India*. 2010 Nov-Dec;58(6):972-4. PubMed PMID: 21150081.
- 37: Rodriguez EF, Scheithauer BW, Giannini C, Ryneerson A, Cen L, Hoesley B, Gilmer-Flynn H, Sarkaria JN, Jenkins S, Long J, Rodriguez FJ. PI3K/AKT pathway alterations are associated with clinically aggressive and histologically anaplastic subsets of pilocytic astrocytoma. *Acta Neuropathol*. 2011 Mar;121(3):407-20. Epub 2010 Nov 28. PubMed PMID: 21113787.
- 38: Cuellar-Baena S, Morales JM, Martinetto H, Calvar J, Sevlever G, Castellano G, Cerdá-Nicolás M, Celda B, Monleon D. Comparative metabolic profiling of paediatric ependymoma, medulloblastoma and pilocytic astrocytoma. *Int J Mol Med*. 2010 Dec;26(6):941-8. PubMed PMID: 21042791.
- 39: Niculescu CE, Stănescu L, Popescu M, Niculescu D. Supratentorial pilocytic astrocytoma in children. *Rom J Morphol Embryol*. 2010;51(3):577-80. PubMed PMID: 20809042.
- 40: Sie M, de Bont ES, Scherpen FJ, Hoving EW, den Dunnen WF. Tumour vasculature and angiogenic

profile of paediatric pilocytic astrocytoma; is it much different from glioblastoma? *Neuropathol Appl Neurobiol.* 2010 Dec;36(7):636-47. doi: 10.1111/j.1365-2990.2010.01113.x. PubMed PMID: 20704656.

41: Kumar AJ, Leeds NE, Kumar VA, Fuller GN, Lang FF, Milas Z, Weinberg JS, Ater JL, Sawaya R. Magnetic resonance imaging features of pilocytic astrocytoma of the brain mimicking high-grade gliomas. *J Comput Assist Tomogr.* 2010 Jul;34(4):601-11. PubMed PMID: 20657231.

42: Payton JE, Schmidt J, Yu J, Lusi EA, Watson MA, Gutmann DH. Genome-wide polymorphism analysis demonstrates a monoclonal origin of pilocytic astrocytoma. *Neuropathol Appl Neurobiol.* 2011 Apr;37(3):321-5. doi: 10.1111/j.1365-2990.2010.01109.x. PubMed PMID: 20646217.

43: Wu PS, Yao WJ. F-18 FDG PET in spinal cord pilocytic astrocytoma. *Clin Nucl Med.* 2010 Aug;35(8):649-50. PubMed PMID: 20631528.

44: Otero-Rodríguez A, Sarabia-Herrero R, García-Tejeiro M, Zamora-Martínez T. Spontaneous malignant transformation of a supratentorial pilocytic astrocytoma. *Neurocirugia (Astur).* 2010 Jun;21(3):245-52. PubMed PMID: 20571729.

45: Crabtree KL, Arnold PM. Spinal seeding of a pilocytic astrocytoma in an adult, initially diagnosed 18 years previously. *Pediatr Neurosurg.* 2010;46(1):66-70. Epub 2010 Jun 1. PubMed PMID: 20516744.

46: Horger M, Ritz R, Beschorner R, Fenchel M, Nägele T, Danz S, Ernemann U. Spinal pilocytic astrocytoma: MR imaging findings at first presentation and following surgery. *Eur J Radiol.* 2011 Sep;79(3):389-99. Epub 2010 May 15. PubMed PMID: 20478675.

47: Lawson AR, Tatevossian RG, Phipps KP, Picker SR, Michalski A, Sheer D, Jacques TS, Forshew T. RAF gene fusions are specific to pilocytic astrocytoma in a broad paediatric brain tumour cohort. *Acta Neuropathol.* 2010 Aug;120(2):271-3. Epub 2010 May 9. PubMed PMID: 20454969.

48: Avery RA, Liu GT. Picture of the month—quiz case. Lisch nodules, ectropion uveae, and optic pathway glioma (juvenile pilocytic astrocytoma) due to neurofibromatosis type 1. *Arch Pediatr Adolesc Med.* 2010 May;164(5):489-90. PubMed PMID: 20439802.

49: Tangour M, Chelly I, Doghri R, Nfoussi H, Mekni A, Ben Hammouda K, Bellil S, Haouet S, Kchir N, Zitouna M, Bellil K. [Pilocytic astrocytoma: unusual feature]. *Tunis Med.* 2010 Jan;88(1):66-7. French. PubMed PMID: 20415223.

50: Colnat-Coulbois S, Klein O, Braun M, Thouvenot P, Marchal JC. Management of intramedullary cystic pilocytic astrocytoma with rhenium-186 intracavitary irradiation: case report. *Neurosurgery.* 2010 May;66(5):E1023-4; discussion E1024. PubMed PMID: 20404673.

51: Jea A, Coscarella E, Chintagumpala M, Bhattacharjee M, Whitehead WE, Curry DJ, Luerssen TG. Medulloblastoma and juvenile pilocytic astrocytoma presenting as synchronous primary brain tumors in a child: case report. *J Neurosurg Pediatr.* 2010 Feb;5(2):149-54. PubMed PMID: 20121362.

52: Rodriguez FJ, Scheithauer BW, Burger PC, Jenkins S, Giannini C. Anaplasia in pilocytic astrocytoma predicts aggressive behavior. *Am J Surg Pathol.* 2010 Feb;34(2):147-60. PubMed PMID: 20061938.

53: Andrychowski J, Taraszewska A, Czernicki Z, Jurkiewicz J, Netczuk T, Dabrowski P. Ten years observation and treatment of multifocal pilocytic astrocytoma. *Folia Neuropathol.* 2009;47(4):362-70. PubMed PMID: 20054789.

54: Karami KJ, Poulik J, Rabah R, Krass J, Sood S. Simultaneous choroid plexus carcinoma and pilocytic

astrocytoma in a pediatric patient. *J Neurosurg Pediatr.* 2010 Jan;5(1):104-12. PubMed PMID: 20043745.

55: Moshel YA, Elliott RE, Monoky DJ, Wisoff JH. Role of diffusion tensor imaging in resection of thalamic juvenile pilocytic astrocytoma. *J Neurosurg Pediatr.* 2009 Dec;4(6):495-505. PubMed PMID: 19951034.

56: Horger M, Beschorner R, Nägele T, Danz S, Ernemann U. [Pilocytic astrocytoma: imaging findings]. *Rofo.* 2009 Dec;181(12):1109-12. Epub 2009 Nov 24. German. PubMed PMID: 19937571.

57: Missler U, Zimmermann M, Grehl H. Atypical pilocytic astrocytoma of the third ventricle appearing as a colloid cyst. *Klin Neuroradiol.* 2009 Dec;19(4):301-5. Epub 2009 Nov 16. PubMed PMID: 19911121.

58: Francesco F, Maurizio I, Stefano C, Marina S, Ugo S, Massimo S. Trigeminal nerve root entry zone pilocytic astrocytoma in an adult: a rare case of an extraparenchymal tumor. *J Neurooncol.* 2010 Apr;97(2):285-90. Epub 2009 Oct 10. PubMed PMID: 19820900.

59: Azad A, Deb S, Cher L. Primary anaplastic pilocytic astrocytoma. *J Clin Neurosci.* 2009 Dec;16(12):1704-6. Epub 2009 Oct 7. PubMed PMID: 19815416.

60: Zakrzewski K, Biernat W, Liberski PP, Polis L, Nowoslawska E. Pilocytic astrocytoma as a predominant component of a recurrent complex type DNT. *Folia Neuropathol.* 2009;47(3):284-8. PubMed PMID: 19813149.

61: Yu J, Deshmukh H, Gutmann RJ, Emnett RJ, Rodriguez FJ, Watson MA, Nagarajan R, Gutmann DH. Alterations of BRAF and HIPK2 loci predominate in sporadic pilocytic astrocytoma. *Neurology.* 2009 Nov 10;73(19):1526-31. Epub 2009 Sep 30. PubMed PMID: 19794125; PubMed Central PMCID: PMC2777068.

62: Subbiah V, Huff V, Wolff JE, Ketonen L, Lang FF Jr, Stewart J, Langford L, Herzog CE. Bilateral gonadoblastoma with dysgerminoma and pilocytic astrocytoma with WT1 GT-IVS9 mutation: A 46 XY phenotypic female with Frasier syndrome. *Pediatr Blood Cancer.* 2009 Dec 15;53(7):1349-51. PubMed PMID: 19653292.

63: Shipman TL. Acute v pattern esotropia without abduction deficit, secondary to a posterior fossa pilocytic astrocytoma. *J Pediatr Ophthalmol Strabismus.* 2009 Jul-Aug;46(4):235-7. doi: 10.3928/01913913-20090706-12. Epub 2009 Mar 20. PubMed PMID: 19645405.

64: Schuettelpelz LG, McDonald S, Whitesell K, Desruisseau DM, Grange DK, Gurnett CA, Wilson DB. Pilocytic astrocytoma in a child with Noonan syndrome. *Pediatr Blood Cancer.* 2009 Dec;53(6):1147-9. PubMed PMID: 19621452.

65: Korshunov A, Meyer J, Capper D, Christians A, Remke M, Witt H, Pfister S, von Deimling A, Hartmann C. Combined molecular analysis of BRAF and IDH1 distinguishes pilocytic astrocytoma from diffuse astrocytoma. *Acta Neuropathol.* 2009 Sep;118(3):401-5. Epub 2009 Jun 19. PubMed PMID: 19543740.

66: Ellis JA, Waziri A, Balmaceda C, Canoll P, Bruce JN, Sisti MB. Rapid recurrence and malignant transformation of pilocytic astrocytoma in adult patients. *J Neurooncol.* 2009 Dec;95(3):377-82. Epub 2009 Jun 17. PubMed PMID: 19533024.

67: Lueth M, Wronski L, Giese A, Kirschner-Schwabe R, Pietsch T, von Deimling A, Henze G, Kurtz A,

Driever PH. Somatic mitochondrial mutations in pilocytic astrocytoma. *Cancer Genet Cytogenet.* 2009 Jul;192(1):30-5. PubMed PMID: 19480934.

68: Aarsen FK, Paquier PF, Arts WF, Van Veelen ML, Michiels E, Lequin M, Catsman-Berrevoets CE. Cognitive deficits and predictors 3 years after diagnosis of a pilocytic astrocytoma in childhood. *J Clin Oncol.* 2009 Jul 20;27(21):3526-32. Epub 2009 May 11. PubMed PMID: 19433687.

69: Daszkiewicz P, Maryniak A, Roszkowski M, Barszcz S. Long-term functional outcome of surgical treatment of juvenile pilocytic astrocytoma of the cerebellum in children. *Childs Nerv Syst.* 2009 Jul;25(7):855-60. Epub 2009 May 6. PubMed PMID: 19418058.

70: Shibahara I, Kanamori M, Kumabe T, Endo H, Sonoda Y, Ogawa Y, Watanabe M, Tominaga T. Hemorrhagic onset of pilocytic astrocytoma and pilomyxoid astrocytoma. *Brain Tumor Pathol.* 2009;26(1):1-5. Epub 2009 Apr 30. PubMed PMID: 19408090.

71: Ehammer T, Lindbichler F, Simbrunner J. [Multifocal pilocytic astrocytoma in infancy]. *Rofo.* 2009 Jul;181(7):693-5. Epub 2009 Apr 28. German. PubMed PMID: 19401978.

72: Jones DT, Kocialkowski S, Liu L, Pearson DM, Ichimura K, Collins VP. Oncogenic RAF1 rearrangement and a novel BRAF mutation as alternatives to KIAA1549:BRAF fusion in activating the MAPK pathway in pilocytic astrocytoma. *Oncogene.* 2009 May 21;28(20):2119-23. Epub 2009 Apr 13. PubMed PMID: 19363522; PubMed Central PMCID: PMC2685777.

73: Tchoghandjian A, Fernandez C, Colin C, El Ayachi I, Voutsinos-Porche B, Fina F, Scavarda D, Piercecchi-Marti MD, Intagliata D, Ouafik L, Fraslou-Vanhulle C, Figarella-Branger D. Pilocytic astrocytoma of the optic pathway: a tumour deriving from radial glia cells with a specific gene signature. *Brain.* 2009 Jun;132(Pt 6):1523-35. Epub 2009 Mar 31. PubMed PMID: 19336457.

74: Tibbetts KM, Emnett RJ, Gao F, Perry A, Gutmann DH, Leonard JR. Histopathologic predictors of pilocytic astrocytoma event-free survival. *Acta Neuropathol.* 2009 Jun;117(6):657-65. Epub 2009 Mar 7. PubMed PMID: 19271226.

75: Berhouma M, Jemel H, Kchir N. Calcified pilocytic astrocytoma of the medulla mimicking a brainstem "stone". *Pathologica.* 2008 Oct;100(5):408-10. PubMed PMID: 19253601.

76: Arantes M, Vaz AR, Honavar M, Resende M, Pereira JR. Pilocytic astrocytoma arising from the pineal gland. *J Neuroradiol.* 2009 Jun;36(3):177-8. Epub 2009 Feb 13. PubMed PMID: 19217662.

77: Masri A, Bakri FG, Assaf A, Musharbash A, Haroun AA, Zak I. Intra-axial dermoid tumor mimicking pilocytic astrocytoma. *Childs Nerv Syst.* 2009 Apr;25(4):395-6. Epub 2009 Jan 30. PubMed PMID: 19184043.

78: Sekula RF Jr, Marchan EM, Quigley MR, Frederickson AM, Pu C. A case of an elderly adult presenting with obstructive hydrocephalus secondary to a rare hemorrhagic suprasellar pilocytic astrocytoma. *Clin Neuropathol.* 2008 Nov-Dec;27(6):396-9. PubMed PMID: 19130737.

79: Zhao YC, Li NY, Zhou XJ, Zhou HB, Ma HH, Zhang RS. [Clinicopathologic study of pilocytic astrocytoma]. *Zhonghua Bing Li Xue Za Zhi.* 2008 Sep;37(9):609-14. Chinese. PubMed PMID: 19094585.

80: Rodriguez FJ, Giannini C, Asmann YW, Sharma MK, Perry A, Tibbetts KM, Jenkins RB, Scheithauer BW, Anant S, Jenkins S, Eberhart CG, Sarkaria JN, Gutmann DH. Gene expression profiling of NF-1-associated and sporadic pilocytic astrocytoma identifies aldehyde dehydrogenase 1 family member L1

(ALDH1L1) as an underexpressed candidate biomarker in aggressive subtypes. *J Neuropathol Exp Neurol*. 2008 Dec;67(12):1194-204. PubMed PMID: 19018242; PubMed Central PMCID: PMC2730602.

81: Zeng N, Liu L, McCabe MG, Jones DT, Ichimura K, Collins VP. Real-time quantitative polymerase chain reaction (qPCR) analysis with fluorescence resonance energy transfer (FRET) probes reveals differential expression of the four ERBB4 juxtamembrane region variants between medulloblastoma and pilocytic astrocytoma. *Neuropathol Appl Neurobiol*. 2009 Aug;35(4):353-66. Epub 2008 Nov 12. PubMed PMID: 19017278; PubMed Central PMCID: PMC2705759.

82: Li HM, Hsu SS, Wang JS, Weng MJ, Fu JH, Chen CK, Lai PH. Cerebral pilocytic astrocytoma with spontaneous intracranial hemorrhage in adults. *J Chin Med Assoc*. 2008 Nov;71(11):587-93. PubMed PMID: 19015059.

83: Schittenhelm J, Ebner FH, Tatagiba M, Wolff M, Nägele T, Meyermann R, Mittelbronn M. Holocord pilocytic astrocytoma—case report and review of the literature. *Clin Neurol Neurosurg*. 2009 Feb;111(2):203-7. Epub 2008 Nov 5. Review. PubMed PMID: 18980798.

84: Kim TW, Lee TK, Kim BS, Lee KS, Song IU, Kim JS. Diurnally fluctuating frontal dysequilibrium secondary to a pineal pilocytic astrocytoma: is this symptom associated with a check-valve mechanism in a pineal region tumor? *Childs Nerv Syst*. 2009 Mar;25(3):367-71. Epub 2008 Oct 30. PubMed PMID: 18972117.

85: Bing F, Kremer S, Lamalle L, Chabardes S, Ashraf A, Pasquier B, Le Bas JF, Krainik A, Grand S. [Value of perfusion MRI in the study of pilocytic astrocytoma and hemangioblastoma: preliminary findings]. *J Neuroradiol*. 2009 May;36(2):82-7. Epub 2008 Oct 18. French. PubMed PMID: 18930545.

86: Ogden AT, Feldstein NA, McCormick PC. Anterior approach to cervical intramedullary pilocytic astrocytoma. Case report. *J Neurosurg Spine*. 2008 Sep;9(3):253-7. PubMed PMID: 18928220.

87: Bar EE, Lin A, Tihan T, Burger PC, Eberhart CG. Frequent gains at chromosome 7q34 involving BRAF in pilocytic astrocytoma. *J Neuropathol Exp Neurol*. 2008 Sep;67(9):878-87. PubMed PMID: 18716556.

88: Mirone G, Schiabello L, Chibbaro S, Bouazza S, George B. Pediatric primary pilocytic astrocytoma of the cerebellopontine angle: a case report. *Childs Nerv Syst*. 2009 Feb;25(2):247-51. Epub 2008 Aug 9. PubMed PMID: 18690462.

89: Potter N, Karakoula A, Phipps KP, Harkness W, Hayward R, Thompson DN, Jacques TS, Harding B, Thomas DG, Palmer RW, Rees J, Darling J, Warr TJ. Genomic deletions correlate with underexpression of novel candidate genes at six loci in pediatric pilocytic astrocytoma. *Neoplasia*. 2008 Aug;10(8):757-72. PubMed PMID: 18670637; PubMed Central PMCID: PMC2481566.

90: Fenton E, Refai D, See W, Rawluk DJ. Supratentorial juvenile pilocytic astrocytoma in a young adult with Silver-Russell syndrome. *Br J Neurosurg*. 2008 Dec;22(6):776-7. PubMed PMID: 18661310.

91: Lee CS, Huh JS, Sim KB, Kim YW. Cerebellar pilocytic astrocytoma presenting with intratumor bleeding, subarachnoid hemorrhage, and subdural hematoma. *Childs Nerv Syst*. 2009 Jan;25(1):125-8. Epub 2008 Jul 16. PubMed PMID: 18629510.

92: Jeon YK, Cheon JE, Kim SK, Wang KC, Cho BK, Park SH. Clinicopathological features and global genomic copy number alterations of pilomyxoid astrocytoma in the hypothalamus/optic pathway: comparative analysis with pilocytic astrocytoma using array-based comparative genomic hybridization. *Mod Pathol*. 2008 Nov;21(11):1345-56. Epub 2008 Jul 11. PubMed PMID: 18622384.

- 93: Neves AM, Thompson G, Carvalho J, Trindade JC, Rueff J, Caetano JM, Casey JW, Hermouet S. Detection and quantitative analysis of human herpesvirus in pilocytic astrocytoma. *Brain Res.* 2008 Jul 24;1221:108-14. Epub 2008 May 15. PubMed PMID: 18565499.
- 94: Catrambone JE, He W, Prestigiacomo CJ, Carmel PW. Monitoring papilledema in a patient with pineal pilocytic astrocytoma by using Heidelberg Retina Tomograph II. Case report. *J Neurosurg.* 2007 Aug;107(2 Suppl):163-6. PubMed PMID: 18459891.
- 95: Hoyama E, Cruz AA, Colli BO, Matos JR, Chahud F. Isolated low grade pilocytic astrocytoma of the optic nerve in the elderly: case report. *Arq Bras Oftalmol.* 2008 Jan-Feb;71(1):97-100. PubMed PMID: 18408847.
- 96: Casado Picón R, Fernández López MC, Lumbreras Fernández J. [Torticollis as an initial sign of posterior fossa tumor: case of child with pilocytic astrocytoma]. *An Pediatr (Barc).* 2008 Mar;68(3):312-3. Review. Spanish. PubMed PMID: 18358153.
- 97: Zhao YC, Li NY, Zhou XJ. [Updates on clinicopathologic researches of pilocytic astrocytoma]. *Zhonghua Bing Li Xue Za Zhi.* 2007 Dec;36(12):846-8. Review. Chinese. PubMed PMID: 18346360.
- 98: Saad A, Tuli S, Ali EN, Houtchens M, Delalle I, Kesari S. Pilocytic astrocytoma of the spinal cord in an adult. *J Neurooncol.* 2008 Jun;88(2):189-91. PubMed PMID: 18340405.
- 99: Tanaka Y, Sasaki A, Ishiuchi S, Nakazato Y. Diversity of glial cell components in pilocytic astrocytoma. *Neuropathology.* 2008 Aug;28(4):399-407. Epub 2008 Feb 26. PubMed PMID: 18312545.
- 100: Arai Y, Tsuchida T, Tanioka F, Sugimura H, Watanabe C, Hongo T, Tsutsui Y. Congenital anaplastic astrocytoma differentiated into pilocytic astrocytoma: an autopsy case. *Neuropathology.* 2008 Aug;28(4):433-9. Epub 2008 Feb 16. PubMed PMID: 18282169.
- 101: Mallur PS, Wisoff JH, Lalwani AK. Steroid responsive fluctuating sensorineural hearing loss due to juvenile pilocytic astrocytoma involving the cerebellopontine angle. *Int J Pediatr Otorhinolaryngol.* 2008 Apr;72(4):529-34. Epub 2008 Feb 5. PubMed PMID: 18255162.
- 102: White JB, Piepgras DG, Scheithauer BW, Parisi JE. Rate of spontaneous hemorrhage in histologically proven cases of pilocytic astrocytoma. *J Neurosurg.* 2008 Feb;108(2):223-6. PubMed PMID: 18240915.
- 103: Burkhardt K, Heuberger F, Delavelle J. Pilocytic astrocytoma in the elderly. *Clin Neuropathol.* 2007 Nov-Dec;26(6):306-10. PubMed PMID: 18232598.
- 104: Jager B, Schuhmann MU, Schober R, Kortmann RD, Meixensberger J. Induction of gliosarcoma and atypical meningioma 13 years after radiotherapy of residual pilocytic astrocytoma in childhood. *Pediatr Neurosurg.* 2008;44(2):153-8. Epub 2008 Jan 24. PubMed PMID: 18230932.
- 105: Blankenburg F, van Landeghem FK, Plotkin M, Henze G, von Deimling A, Driever PH. Occurrence of a spinal anaplastic pilocytic astrocytoma and a supratentorial PNET in an adolescent. *J Pediatr Hematol Oncol.* 2007 Dec;29(12):832-5. PubMed PMID: 18090931.
- 106: Stürer C, Vilz B, Majores M, Becker A, Schramm J, Simon M. Frequent recurrence and progression in pilocytic astrocytoma in adults. *Cancer.* 2007 Dec 15;110(12):2799-808. PubMed PMID: 17973253.
- 107: Janzarik WG, Kratz CP, Loges NT, Olbrich H, Klein C, Schäfer T, Scheurlen W, Roggendorf W, Weiller C, Niemeyer C, Korinthenberg R, Pfister S, Omran H. Further evidence for a somatic KRAS

- mutation in a pilocytic astrocytoma. *Neuropediatrics*. 2007 Apr;38(2):61-3. PubMed PMID: 17712732.
- 108: Kim SJ, Lee WY, Kim BJ, Kim JY, Hong SB, Tae WS, Seo DW. Isolated tongue tremor after removal of cerebellar pilocytic astrocytoma: Functional analysis with SPECT study. *Mov Disord*. 2007 Sep 15;22(12):1825-8. PubMed PMID: 17657811.
- 109: Koksall Y, Toy H, Unal E, Baysal T, Esen H, Paksoy Y, Ustun ME. Pilocytic astrocytoma developing at the site of a previously treated medulloblastoma in a child. *Childs Nerv Syst*. 2008 Mar;24(3):289-92. Epub 2007 Jul 27. PubMed PMID: 17657496.
- 110: Josan V, Smith P, Kornberg A, Rickert C, Maixner W. Development of a pilocytic astrocytoma in a dysembryoplastic neuroepithelial tumor. Case report. *J Neurosurg*. 2007 Jun;106(6 Suppl):509-12. PubMed PMID: 17566412.
- 111: Shingu T, Akiyama Y, Daisu M, Maruyama N, Matsumoto Y, Miyazaki T, Nagai H, Yamamoto Y, Yamasaki T, Yoshida M, Maruyama R, Moritake K. Symptomatic hemorrhage associated with recurrent pilocytic astrocytoma with granulation tissue—case report. *Neurol Med Chir (Tokyo)*. 2007 May;47(5):222-8. PubMed PMID: 17527050.
- 112: Oka F, Yamashita Y, Kumabe T, Tominaga T. Total resection of a hemorrhagic tectal pilocytic astrocytoma—case report. *Neurol Med Chir (Tokyo)*. 2007 May;47(5):219-21. PubMed PMID: 17527049.
- 113: Hafez RF. Stereotaxic gamma knife surgery in treatment of critically located pilocytic astrocytoma: preliminary result. *World J Surg Oncol*. 2007 Mar 29;5:39. PubMed PMID: 17394660; PubMed Central PMCID: PMC1852107.
- 114: Abel TJ, Chowdhary A, Thapa M, Rutledge JC, Geyer JR, Ojemann J, Avellino AM. Spinal cord pilocytic astrocytoma with leptomeningeal dissemination to the brain. Case report and review of the literature. *J Neurosurg*. 2006 Dec;105(6 Suppl):508-14. Review. PubMed PMID: 17184088.
- 115: Larson DB, Hedlund GL. Non-enhancing pilocytic astrocytoma of the spinal cord. *Pediatr Radiol*. 2006 Dec;36(12):1312-5. Epub 2006 Oct 5. PubMed PMID: 17021719.
- 116: Malik A, Deb P, Sharma MC, Sarkar C. Neuropathological spectrum of pilocytic astrocytoma: an Indian series of 120 cases. *Pathol Oncol Res*. 2006;12(3):164-71. Epub 2006 Sep 23. PubMed PMID: 16998597.
- 117: Faria AV, Azevedo GC, Zanardi VA, Ghizoni E, Queiroz LS. Dissemination patterns of pilocytic astrocytoma. *Clin Neurol Neurosurg*. 2006 Sep;108(6):568-72. PubMed PMID: 16905433.
- 118: Tsuboi K, Matsuda W, Nakamura K, Takano S, Matsumura A. Excision of juvenile pilocytic astrocytoma of the midbrain after radiotherapy. *Pediatr Neurosurg*. 2006;42(5):311-5. PubMed PMID: 16902345.
- 119: Addo-Yobo SO, Straessle J, Anwar A, Donson AM, Kleinschmidt-Demasters BK, Foreman NK. Paired overexpression of ErbB3 and Sox10 in pilocytic astrocytoma. *J Neuropathol Exp Neurol*. 2006 Aug;65(8):769-75. PubMed PMID: 16896310.
- 120: Ceppa EP, Bouffet E, Griebel R, Robinson C, Tihan T. The pilomyxoid astrocytoma and its relationship to pilocytic astrocytoma: report of a case and a critical review of the entity. *J Neurooncol*. 2007 Jan;81(2):191-6. Epub 2006 Jul 19. PubMed PMID: 16850101.
- 121: Lim SC, Hong R, Kim YS, Jang SJ. Large cystic cavernous angioma of the cerebellum mimicking

pilocytic astrocytoma. *J Neurooncol.* 2006 Sep;79(2):169-70. Epub 2006 Jul 5. PubMed PMID: 16821089.

122: Burel-Vandenbos F, Jouvett A, Chanalet S, Lonjon M, Cardot-Leccia N, Michiels JF. [An unusual and misleading form of pilocytic astrocytoma]. *Ann Pathol.* 2006 Apr;26(2):126-8. French. PubMed PMID: 16791125.

123: Canesso A, Gardiman M, Salmaso R, Alaggio R, Ninfo V. An unusual case of malignant pilocytic astrocytoma occurring in the eye. *Virchows Arch.* 2006 Aug;449(2):248-52. Epub 2006 May 20. PubMed PMID: 16715230.

124: Saka E, Ozkaynak S, Tuncer R. Tongue tremor in brainstem pilocytic astrocytoma. *J Clin Neurosci.* 2006 May;13(4):503-6. PubMed PMID: 16678738.

125: Lyons MK. Pilocytic astrocytoma with spontaneous intracranial hemorrhages in an elderly adult. *Clin Neurol Neurosurg.* 2007 Jan;109(1):76-80. Epub 2006 Apr 18. PubMed PMID: 16621238.

126: Klein O, Grignon Y, Civit T, Pinelli C, Auque J, Marchal JC. [Childhood diencephalic pilocytic astrocytoma. A review of seven observations]. *Neurochirurgie.* 2006 Feb;52(1):3-14. French. PubMed PMID: 16609655.

127: Distelmaier F, Janssen G, Mayatepek E, Schaper J, Göbel U, Rosenbaum T. Disseminated pilocytic astrocytoma involving brain stem and diencephalon: a history of atypical eating disorder and diagnostic delay. *J Neurooncol.* 2006 Sep;79(2):197-201. Epub 2006 Apr 6. PubMed PMID: 16598421.

128: Arai K, Sato N, Aoki J, Yagi A, Taketomi-Takahashi A, Morita H, Koyama Y, Oba H, Ishiuchi S, Saito N, Endo K. MR signal of the solid portion of pilocytic astrocytoma on T2-weighted images: is it useful for differentiation from medulloblastoma? *Neuroradiology.* 2006 Apr;48(4):233-7. Epub 2006 Mar 21. PubMed PMID: 16550430.

129: Kitagawa M, Sato T, Ishizaki R, Saiki M. [Resolution of migraine with aura by removing pilocytic astrocytoma of the occipital lobe]. *No Shinkei Geka.* 2006 Jan;34(1):59-64. Japanese. PubMed PMID: 16440698.

130: Berg AL, Olson TJ, Feldstein NA. Cerebellar pilocytic astrocytoma with auditory presentation: case study. *J Child Neurol.* 2005 Nov;20(11):914-5. PubMed PMID: 16417863.

131: Sharma MK, Watson MA, Lyman M, Perry A, Aldape KD, Deák F, Gutmann DH. Matriline-2 expression distinguishes clinically relevant subsets of pilocytic astrocytoma. *Neurology.* 2006 Jan 10;66(1):127-30. PubMed PMID: 16401863.

132: Rodríguez-Francia P, Sánchez-Tocino H, García-Cantera M, Martín-Castillo J. [Optic nerve pilocytic astrocytoma with retinal involvement]. *Arch Soc Esp Oftalmol.* 2005 Dec;80(12):733-6. Spanish. PubMed PMID: 16372218.

133: Colin C, Baeza N, Bartoli C, Fina F, Eudes N, Nanni I, Martin PM, Ouafik L, Figarella-Branger D. Identification of genes differentially expressed in glioblastoma versus pilocytic astrocytoma using Suppression Subtractive Hybridization. *Oncogene.* 2006 May 4;25(19):2818-26. PubMed PMID: 16314830.

134: Sharma MK, Zehnbauser BA, Watson MA, Gutmann DH. RAS pathway activation and an oncogenic RAS mutation in sporadic pilocytic astrocytoma. *Neurology.* 2005 Oct 25;65(8):1335-6. PubMed PMID: 16247081.

- 135: Taraszewska A, Czernicki Z, Andrychowski J. Hemosiderin pigmentation of tumour cells in cerebellar pilocytic astrocytoma associated with post-traumatic hemorrhage in adults. *Folia Neuropathol.* 2005;43(3):172-7. PubMed PMID: 16245213.
- 136: Kestle J, Townsend JJ, Brockmeyer DL, Walker ML. Juvenile pilocytic astrocytoma of the brainstem in children. *J Neurosurg.* 2004 Aug;101(1 Suppl):1-6. PubMed PMID: 16206964.
- 137: Foreman NK, Gore L, Wells D, Straessle J, Heideman R, Donson AM. Gefitinib is effective against juvenile pilocytic astrocytoma in vitro. *Pediatr Blood Cancer.* 2006 Sep;47(3):293-8. PubMed PMID: 16206208.
- 138: Zorlu F, Selek U, Akyuz C, Ozturk A, Soylemezoglu F, Akalan N. Spinal seeding of a pilocytic astrocytoma following multiple subtotal resections. *Pediatr Neurosurg.* 2005 Sep-Oct;41(5):248-52. PubMed PMID: 16195677.
- 139: Bohner G, Masuhr F, Distl R, Katchanov J, Klingebiel R, Zschenderlein R, von Deimling A, van Landeghem FK. Pilocytic astrocytoma presenting as primary diffuse leptomeningeal gliomatosis: report of a unique case and review of the literature. *Acta Neuropathol.* 2005 Sep;110(3):306-11. Epub 2005 Jul 8. PubMed PMID: 16003541.
- 140: Kanda M, Tanaka H, Shinoda S, Masuzawa T. Leptomeningeal dissemination of pilocytic astrocytoma via hematoma in a child. Case report. *Neurosurg Focus.* 2002 Jul 15;13(1):ECP2. Review. PubMed PMID: 15916413.
- 141: Narayana A, Bhatia S, Souweidane M, Khakoo Y, Zaider M. (32)P radioisotope therapy for recurrent pilocytic astrocytoma. *Brachytherapy.* 2005;4(2):171-3. PubMed PMID: 15893272.
- 142: Bell D, Chitnavis BP, Al-Sarraj S, Connor S, Sharr MM, Gullan RW. Pilocytic astrocytoma of the adult-clinical features, radiological features and management. *Br J Neurosurg.* 2004 Dec;18(6):613-6. PubMed PMID: 15799194.
- 143: Ebinger M, Senf L, Wachowski O, Scheurlen W. No aberrant methylation of neurofibromatosis 1 gene (NF1) promoter in pilocytic astrocytoma in childhood. *Pediatr Hematol Oncol.* 2005 Jan-Feb;22(1):83-7. PubMed PMID: 15770836.
- 144: Kim SH, Kim TS. Squash smear findings of eosinophilic granular bodies in pilocytic astrocytoma. *Acta Cytol.* 2005 Jan-Feb;49(1):112-4. PubMed PMID: 15717769.
- 145: Koeller KK, Rushing EJ. From the archives of the AFIP: pilocytic astrocytoma: radiologic-pathologic correlation. *Radiographics.* 2004 Nov-Dec;24(6):1693-708. Review. PubMed PMID: 15537977.
- 146: Aryan HE, Meltzer HS, Lu DC, Ozgur BM, Levy ML, Bruce DA. Management of pilocytic astrocytoma with diffuse leptomeningeal spread: two cases and review of the literature. *Childs Nerv Syst.* 2005 Jun;21(6):477-81. Epub 2004 Sep 15. Review. PubMed PMID: 15378329.
- 147: Goetz C, Peraud A, Kreth FW, Tonn JC. [Pilocytic astrocytoma in childhood]. *MMW Fortschr Med.* 2004 Apr 1;146(14):24-5. Review. German. PubMed PMID: 15344746.
- 148: Miyamoto S, Mikuni N, Yamada K, Takahashi JA, Hashimoto N. Radical resection for intrinsic midbrain pilocytic astrocytoma: report of two cases. *Acta Neurochir (Wien).* 2005 Jan;147(1):93-7; discussion 97. PubMed PMID: 15309583.
- 149: Garg A, Chugh M, Gaikwad SB, Chandra SP, Gupta V, Mishra NK, Sharma MC. Juvenile pilocytic

- astrocytoma presenting with subarachnoid hemorrhage. Case report and review of the literature. *J Neurosurg.* 2004 May;100(5 Suppl Pediatrics):525-9. Review. PubMed PMID: 15287467.
- 150: Darwish B, Koleda C, Lau H, Balakrishnan V, Wickremesekera A. Juvenile pilocytic astrocytoma 'pilomyxoid variant' with spinal metastases. *J Clin Neurosci.* 2004 Aug;11(6):640-2. PubMed PMID: 15261239.
- 151: Bannykh S. Images in neuro-oncology. Pilocytic astrocytoma. *J Neurooncol.* 2004 May;67(3):335. PubMed PMID: 15164989.
- 152: Kan P, Gottfried O, Blumenthal DT, Townsend JJ, Drozd-Borysiuk E, Brothman AR, Jensen RL. Oligodendroglioma and juvenile pilocytic astrocytoma presenting as synchronous primary brain tumors. Case report with histological and molecular differentiation of the tumors and review of the literature. *J Neurosurg.* 2004 Apr;100(4):700-5. PubMed PMID: 15070126.
- 153: Shaya MR, Fowler MR, Nanda A. Pilocytic astrocytoma presenting as an intrinsic brainstem tumor: case report and review of the literature. *J La State Med Soc.* 2004 Jan-Feb;156(1):33-6. PubMed PMID: 15000211.
- 154: Browne TJ, Goumnerova LC, De Girolami U, Cibas ES. Cytologic features of pilocytic astrocytoma in cerebrospinal fluid specimens. *Acta Cytol.* 2004 Jan-Feb;48(1):3-8. PubMed PMID: 14969173.
- 155: Hajdu SI. Pilocytic astrocytoma. *Acta Cytol.* 2004 Jan-Feb;48(1):1-2. PubMed PMID: 14969172.
- 156: Yousry I, Muacevic A, Olteanu-Nerbe V, Naidich TP, Yousry TA. Exophytic pilocytic astrocytoma of the brain stem in an adult with encasement of the caudal cranial nerve complex (IX-XII): presurgical anatomical neuroimaging using MRI. *Eur Radiol.* 2004 Jul;14(7):1169-73. Epub 2004 Jan 22. PubMed PMID: 14740164.
- 157: Prabhash K, Babu KG, Balu S, Haritha C, Bapsy PP. Hodgkin's disease and pilocytic astrocytoma—a synchronous presentation. *J Assoc Physicians India.* 2003 Aug;51:833-4. PubMed PMID: 14651156.
- 158: Figueiredo EG, Matushita H, Machado AG, Plese JP, Rosemberg S, Marino R Jr. Leptomeningeal dissemination of pilocytic astrocytoma at diagnosis in childhood: two cases report. *Arq Neuropsiquiatr.* 2003 Sep;61(3B):842-7. Epub 2003 Oct 28. Review. PubMed PMID: 14595493.
- 159: Reís A, Kuzeylí K, Cobanoğlu U, Cakir E, Usul H, Sari A. Pilocytic astrocytoma of neurohypophysis. *Neuropathology.* 2003 Sep;23(3):214-8. PubMed PMID: 14570290.
- 160: Lach B, Al Shail E, Patay Z. Spontaneous anaplasia in pilocytic astrocytoma of cerebellum. *Br J Neurosurg.* 2003 Jun;17(3):250-2. PubMed PMID: 14565523.
- 161: Beckner ME, Lee JY, Schochet SS Jr, Chu CT. Intracranial extramedullary hematopoiesis associated with pilocytic astrocytoma: a case report. *Acta Neuropathol.* 2003 Dec;106(6):584-7. Epub 2003 Sep 30. PubMed PMID: 14520481.
- 162: Kohira I, Yoshimura Y, Ninomiya Y, Ikeda K, Iwata J. [Pilocytic astrocytoma and diencephalic syndrome in an adult with neurofibromatosis type 1]. *Rinsho Shinkeigaku.* 2003 Jun;43(6):327-9. Japanese. PubMed PMID: 14503350.
- 163: McLaughlin ME, Robson CD, Kieran MW, Jacks T, Pomeroy SL, Cameron S. Marked regression of metastatic pilocytic astrocytoma during treatment with imatinib mesylate (STI-571, Gleevec): a case report and laboratory investigation. *J Pediatr Hematol Oncol.* 2003 Aug;25(8):644-8. PubMed PMID:

12902920.

164: Bernaerts A, Vanhoenacker F, Debois V, Parizel PM. Juvenile pilocytic astrocytoma. JBR-BTR. 2003 May-Jun;86(3):142-3. PubMed PMID: 12880155.

165: Jenkinson MD, Javadpour M, du Plessis D, Shaw MD. Synchronous basal cell carcinoma and meningioma following cranial irradiation for a pilocytic astrocytoma. Br J Neurosurg. 2003 Apr;17(2):182-4. PubMed PMID: 12820764.

166: Burkhard C, Di Patre PL, Schüller D, Schüller G, Yaşargil MG, Yonekawa Y, Lütolf UM, Kleihues P, Ohgaki H. A population-based study of the incidence and survival rates in patients with pilocytic astrocytoma. J Neurosurg. 2003 Jun;98(6):1170-4. PubMed PMID: 12816259.

167: Kageji T, Nagahiro S, Horiguchi H, Watanabe T, Suzuya H, Okamoto Y, Kuroda Y. Successful high-dose chemotherapy for widespread neuroaxis dissemination of an optico-hypothalamic juvenile pilocytic astrocytoma in an infant: a case report. J Neurooncol. 2003 May;62(3):281-7. PubMed PMID: 12777080.

168: Arita K, Kurisu K, Sugiyama K, Itoh Y, Hotta T, Sogabe T, Uozumi T. Long-term results of conventional treatment of diencephalic pilocytic astrocytoma in infants. Childs Nerv Syst. 2003 Mar;19(3):145-51. Epub 2003 Feb 13. PubMed PMID: 12644865.

169: van der Wal EJ, Azzarelli B, Edwards-Brown M. Malignant transformation of a chiasmatic pilocytic astrocytoma in a patient with diencephalic syndrome. Pediatr Radiol. 2003 Mar;33(3):207-10. Epub 2002 Dec 13. PubMed PMID: 12612823.

170: Katsuta T, Inoue T, Nakagaki H, Takeshita M, Morimoto K, Iwaki T. Distinctions between pituicytoma and ordinary pilocytic astrocytoma. Case report. J Neurosurg. 2003 Feb;98(2):404-6. PubMed PMID: 12593630.

171: Sant'Ana FJ, Serakides R, Graça DL. Pilocytic astrocytoma in a cat. Vet Pathol. 2002 Nov;39(6):759-61. PubMed PMID: 12450212.

172: Yassari R, Jahromi B, Macdonald R. Dural arteriovenous fistula after craniotomy for pilocytic astrocytoma in a patient with protein S deficiency. Surg Neurol. 2002 Jul;58(1):59-64; discussion 64. PubMed PMID: 12361657.

173: Nakamizo A, Inamura T, Ikezaki K, Yoshimoto K, Inoha S, Mizoguchi M, Amano T, Fukui M. Enhanced apoptosis in pilocytic astrocytoma: a comparative study of apoptosis and proliferation in astrocytic tumors. J Neurooncol. 2002 Apr;57(2):105-14. PubMed PMID: 12125970.

174: Philipson MR, Timothy J, Chakrobarthy A, Towns G. Pilocytic astrocytoma of a spinal nerve root. Case report. J Neurosurg. 2002 Jul;97(1 Suppl):110-2. PubMed PMID: 12120632.

175: Skopelitou A, Mitselou A, Michail M, Mitselos V, Stefanou D. Pilocytic astrocytoma arising in a dermoid cyst of the ovary: a case presentation. Virchows Arch. 2002 Jan;440(1):105-6. PubMed PMID: 11942569.

176: Berroir S, Lafitte F, Héran F, Boissonnet H, Polivka M, Piekarski JD. Pilocytic astrocytoma: unusual feature. J Neuroradiol. 2001 Dec;28(4):249-52. PubMed PMID: 11924140.

177: Pompili A, Caperle M, Pace A, Ramazzotti V, Raus L, Jandolo B, Occhipinti E. Quality-of-life assessment in patients who had been surgically treated for cerebellar pilocytic astrocytoma in

childhood. J Neurosurg. 2002 Feb;96(2):229-34. PubMed PMID: 11838795.

178: Sobottka SB, Huebner A, Haase M, Ahrens W, Rupprecht E, Schackert HK, Schackert G. Albright's hereditary osteodystrophy associated with cerebellar pilocytic astrocytoma: coincidence or genetic relationship? Horm Res. 2001;55(4):196-200. Review. PubMed PMID: 11598374.

179: Krist D, Wenkel H, Gusek-Schneider GC. [Squint amblyopia as a masking symptom. Juvenile pilocytic astrocytoma of the optic nerve (WHO grade I)]. Ophthalmologe. 2001 Jun;98(6):582-3. German. PubMed PMID: 11450486.

180: Ng HK, Leung CH, Boet R, Poon WS. Spinal cord pilocytic astrocytoma with cranial meningeal metastases. J Clin Neurosci. 2001 Jul;8(4):374-7. PubMed PMID: 11437586.

181: Senaratna S, Hanieh A, Manson J, Toogood I. Multiple cystic brain lesions in a patient with pilocytic astrocytoma. J Clin Neurosci. 2001 Jul;8(4):363-6. Review. PubMed PMID: 11437582.

182: Mesiwala AH, Avellino AM, Roberts TS, Ellenbogen RG. Spontaneous cerebellar hemorrhage due to a juvenile pilocytic astrocytoma: case report and review of the literature. Pediatr Neurosurg. 2001 May;34(5):235-8. PubMed PMID: 11423772.

183: Bowers DC, Krause TP, Aronson LJ, Barzi A, Burger PC, Carson BS, Weingart JD, Wharam MD, Melhem ER, Cohen KJ. Second surgery for recurrent pilocytic astrocytoma in children. Pediatr Neurosurg. 2001 May;34(5):229-34. PubMed PMID: 11423771.

184: Yoshiura T, Shrier DA, Pilcher WH, Saunders CA. Case report: Hemispheric juvenile pilocytic astrocytoma with extreme exophytic growth. Clin Radiol. 2001 May;56(5):427-30. PubMed PMID: 11384146.

185: Matsushige T, Yoshioka H, Yamasaki F, Sugiyama K, Arita K, Kurisu K, Hamasaki O, Yano T. [A case of juvenile pilocytic astrocytoma with unusual neuroimaging features]. No To Shinkei. 2001 Apr;53(4):391-5. Japanese. PubMed PMID: 11360482.

186: Amagasa M, Kojima H, Yuda F, Ohtomo S, Numagami Y, Sato S. Pilocytic astrocytoma arising from an area of nodular heterotopia located in the white matter of the temporal lobe: case report. Brain Tumor Pathol. 2000;17(3):147-51. PubMed PMID: 11310922.

187: Aichholzer M, Gruber A, Haberler C, Bertalanffy A, Slavc I, Czech T. Intracranial hemorrhage from an aneurysm encased in a pilocytic astrocytoma—case report and review of the literature. Childs Nerv Syst. 2001 Feb;17(3):173-8. PubMed PMID: 11305772.

188: Fellgiebel A, Erbguth F, Neundörfer B. [Polyradiculopathy and ataxia: clinical manifestation of late recurrence of pilocytic astrocytoma with cerebral and spinal dissemination]. Nervenarzt. 2001 Feb;72(2):143-6. German. PubMed PMID: 11256149.

189: Nishikawa R. [Pilocytic astrocytoma]. Ryoikibetsu Shokogun Shirizu. 2000;(28 Pt 3):23-5. Review. Japanese. PubMed PMID: 11043169.

190: Kim AL, Fernandez CV, Greer WL, Hogg D, Lassam NJ, Resch L. Concurrent acute lymphoblastic leukemia and juvenile pilocytic astrocytoma in a pediatric patient. J Pediatr Hematol Oncol. 2000 Sep-Oct;22(5):451-3. PubMed PMID: 11037859.

191: Golash A, Thorne J, West CG. Low grade pilocytic astrocytoma presenting as a spontaneous intracerebral haemorrhage in a child. Br J Neurosurg. 1998 Feb;12(1):59-62. PubMed PMID: 11013653.

- 192: Jamjoom AB, Jamjoom ZA, al-Rayess M. Intraventricular and leptomeningeal dissemination of a pilocytic cerebellar astrocytoma in a child with a ventriculoperitoneal shunt: case report. *Br J Neurosurg*. 1998 Feb;12(1):56-8. PubMed PMID: 11013652.
- 193: Bonilha L, Borges G, Fernandes YB, Ramina R, Carelli EF, Alvarenga M. Pilocytic astrocytoma following radiotherapy for craniopharyngioma: case report. *Arq Neuropsiquiatr*. 2000 Sep;58(3A):731-5. PubMed PMID: 10973118.
- 194: Balkhoyor KB, Bernstein M. Involution of diencephalic pilocytic astrocytoma after partial resection. Report of two cases in adults. *J Neurosurg*. 2000 Sep;93(3):484-6. PubMed PMID: 10969949.
- 195: Beni-Adani L, Gomori M, Spektor S, Constantini S. Cyst wall enhancement in pilocytic astrocytoma: neoplastic or reactive phenomena. *Pediatr Neurosurg*. 2000 May;32(5):234-9. PubMed PMID: 10965269.
- 196: Bostantjopoulou S, Katsarou Z, Pigadas A, Kazis A. Superficial CNS siderosis and spinal pilocytic astrocytoma. *Neurology*. 2000 Aug 8;55(3):450. PubMed PMID: 10932289.
- 197: Colosimo C, Cerase A, Maira G. Regression after biopsy of a pilocytic opticochiasmatic astrocytoma in a young adult without neurofibromatosis. *Neuroradiology*. 2000 May;42(5):352-6. PubMed PMID: 10872155.
- 198: Amato VG, Arienta C, Sparacio F. Dorsally exophytic brain stem tumors: total removal of a medullary pilocytic astrocytoma in child. *Clinicopathological considerations and case report. J Neurosurg Sci*. 1999 Dec;43(4):299-304. PubMed PMID: 10864393.
- 199: Boch AL, Cacciola F, Mokhtari K, Kujas M, Philippon J. Benign recurrence of a cerebellar pilocytic astrocytoma 45 years after gross total resection. *Acta Neurochir (Wien)*. 2000;142(3):341-6. PubMed PMID: 10819266.
- 200: Kuroiwa T, Ohta T, Tsutsumi A. Malignant pilocytic astrocytoma in the medulla oblongata: case report. *Brain Tumor Pathol*. 1999;16(2):81-5. PubMed PMID: 10746965.

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