

## Daftar Pustaka

1. Wiemels J, Wrensch M, Claus EB. Epidemiology and etiology of meningioma. *J Neurooncol.* 2010 Sep;99(3):307-14. [[PMC free article](#)] [[PubMed](#)] [[Reference list](#)]
2. Wilson TA, Huang L, Ramanathan D, Lopez-Gonzalez M, Pillai P, De Los Reyes K, Kumal M and Boling W (2020) Review of Atypical and Anaplastic Meningiomas: Classification, Molecular Biology, and Management. *Front. Oncol.* 10:565582. doi: 10.3389/fonc.2020.565582
3. Ostrom QT, Gittleman H, Xu J, Kromer C, Wolinsky Y, Kruchko C, et al. CBTRUS statistical report: primary brain and other central nervous system tumors diagnosed in the United States in 2009-2013. *Neurooncology.* (2016) 18:v1–75. doi: 10.1093/neuonc/nov207
4. Riemenschneider MJ, Perry A, Reifenberger G. Histological classification and molecular genetics of meningiomas. *Lancet Neurol.* (2006) 5:1045–54. doi: 10.1016/S1474-4422(06)70625-1
5. Louis DN, Ohgaki H, Wiestler OD, Cavenee WK, Burger PC, Jouvet A, et al. The 2007 WHO classification of tumours of the central nervous system. *Acta Neuropathol.* (2007) 114:97–109. doi: 10.1007/s00401-007-0243-4
6. Olar A, Wani KM, Sulman EP, Mansouri A, Zadeh G, Wilson CD, et al. Mitotic index is an independent predictor of recurrence-free survival in meningioma. *Brain Pathol.* (2015) 25:266–75. doi: 10.1111/bpa.12174
7. Kang H, Song SW, Ha J, Won YJ, Park CK, Yoo H, et al. A nationwide, population-based epidemiology study of primary central nervous system

- tumors in Korea, 2007-2016: a comparison with United States data. *Cancer Res Trea* 2021;53:355-66
8. Hug EB, Devries A, Thornton AF, Munzenride JE, Pardo FS, HedleyWhyte ET, et al. Management of atypical and malignant meningiomas: role of high-dose, 3D-conformal radiation therapy. *J Neurooncol* 2000; 48:151-60.
  9. Kaur G, Sayegh ET, Larson A, Bloch O, Madden M, Sun MZ, et al. Adjuvant radiotherapy for atypical and malignant meningiomas: a systematic review. *Neuro Oncol* 2014;16:628-36.
  10. Orton A, Frandsen J, Jensen R, Shrieve DC, Suneja G. Anaplastic meningioma: an analysis of the National Cancer Database from 2004 to 2012. *J Neurosurg* 2018;128:1684-9.
  11. Seo Dong Ok, Sang Woo Song et al. Anaplastic Meningioma : Clinical characteristics, Prognostic Factors and Survival Outcome. *Brain Tumor Res Treat.* 2022;10(4):244-254
  12. Di Bonaventura, R.; Lauretti, L.; Martini, M.; Cenci, T.; Di Monaco, G.; Palombi, D.; Ceccarelli, G.M.; Chiesa, S.; Gessi, M.; Granitto, A.; et al. Paths of Evolution of Progressive Anaplastic Meningiomas: A Clinical and Molecular Pathology Study. *J. Pers. Med.* 2023, 13, 206. <https://doi.org/10.3390/jpm13020206>
  13. Hsu DW, Efird JT, Hedley-Whyte ET. Progesterone and estrogen receptors in meningiomas: prognostic considerations. *J Neurosurg.* (1997) 86:113–20. doi: 10.3171/jns.1997.86.1.0113

14. Kane AJ, Sughrue ME, Rutkowski MJ, Shangari G, Fang S, McDermott MW, et al. Anatomic location is a risk factor for atypical and malignant meningiomas. *Cancer*. (2011) 117:1272–8. doi: 10.1002/cncr.25591
15. Mahmood A, Caccamo DV, Tomecek FJ, Malik GM. Atypical and malignant meningiomas: a clinicopathological review. *Neurosurgery*. (1993) 33:955–63. doi: 10.1227/00006123-199312000-00001
16. Hijiya N, Hudson MM, Lensing S, Zacher M, Onciu M, Behm FG, et al. Cumulative incidence of secondary neoplasms as a first event after childhood acute lymphoblastic leukemia. *JAMA*. (2007) 297:1207–15. doi: 10.1001/jama.297.11.1207
17. Preston DL, Ron E, Yonehara S, Kobuke T, Fujii H, Kishikawa M, et al. Tumors of the nervous system and pituitary gland associated with atomic bomb radiation exposure. *J Natl Cancer Inst*. (2002) 94:1555–63. doi: 10.1093/jnci/94.20.1555
18. Louis DN, Perry A, Reifenberger G, von Deimling A, Figarella-Branger D, Cavenee WK, et al. The 2016 World Health Organization classification of tumors of the central nervous system: a summary. *Acta Neuropathol*. (2016) 131:803–20. doi: 10.1007/s00401-016-1545-1
19. Rogers L, Gilbert M, Vogelbaum MA. Intracranial meningiomas of atypical (WHO grade II) histology. *J Neurooncol*. (2010) 99:393–405. doi: 10.1007/s11060-010-0343-1
20. Adeberg S, Hartmann C, Welzel T, et al. Long-term outcome after radiotherapy in patients with atypical and malignant meningiomas-clinical

- results in 85 patients treated in a single institution leading to optimized guidelines for early radiation therapy. *Int J Radiat Oncol Biol Phys.* 2011;83:859-864.
21. Pearson BE, Markert JM, Fisher WS, Guthrie BL, Fiveash JB, Palmer CA, et al. Hitting a moving target: evolution of a treatment paradigm for atypical meningiomas amid changing diagnostic criteria. *Neurosurg Focus.* (2008) 24:E3. doi: 10.3171/FOC/2008/24/5/E3
  22. Prayson R. *Neuropathology.* 2nd ed. Philadelphia, PA: Elsevier Saunders (2012). P. 513–60
  23. Durand A, Labrousse F, Jouvett A, et al. WHO grade II and III meningiomas: a study of prognostic factors. *J Neurooncol.* 2009;95:367-375.
  24. Simpson D. The recurrence of intracranial meningiomas after surgical treatment. *J Neurol Neurosurg Psychiatry.* (1957) 20:22–39. doi: 10.1136/jnnp.20.1.22
  25. Aghi MK, Carter BS, Cosgrove GR, Ojemann RG, Amin-Hanjani S, Martuza RL, et al. Long-term recurrence rates of atypical meningiomas after gross total resection with or without postoperative adjuvant radiation. *Neurosurgery.* (2009) 64:56–60; discussion 60. doi: 10.1227/01.NEU.0000330399.55586.63
  26. Condra KS, Buatti JM, Mendenhall WM, Friedman WA, Marcus RB, Rhoton AL. Benign meningiomas: primary treatment selection affects

- survival. *Int J Radiat Oncol Biol Phys.* (1997) 39:427–36. doi: 10.1016/S0360-3016(97)00317-9
27. Palma L, Celli P, Franco C, Cervoni L, Cantore G. Long-term prognosis for atypical and malignant meningiomas: a study of 71 surgical cases. *Neurosurg Focus.* (1997) 2:e3. doi: 10.3171/foc.1997.2.4.6
28. Mooney MA, Abolfotoh M, Bi WL, Tavanaiepour D, Almefty RO, Bassiouni H, et al. Is falxine meningioma a diffuse disease of the falx? Case Series and Analysis of a “Grade Zero” Resection. *Neurosurgery.* (2020) 87:900–9. doi: 10.1093/neuros/nyaa038
29. Graffeo CS, Leeper HE, Perry A, Uhm JH, Lachance DJ, Brown PD, et al. Revisiting adjuvant radiotherapy after gross total resection of World Health Organization grade II meningioma. *World Neurosurg.* (2017) 103:655–63. doi: 10.1016/j.wneu.2017.04.095
30. Buerki RA, Horbinski CM, Kruser T, Horowitz PM, James CD, Lukas RV. An overview of meningiomas. *Future Oncol.* (2018) 14:2161–77. doi: 10.2217/fon-2018-0006
31. Goyal M, Demchuk AM, Menon BK, Eesa M, Rempel JL, Thornton J, et al. Randomized assessment of rapid endovascular treatment of ischemic stroke. *N Engl J Med.* (2015) 372:1019–30. doi: 10.1056/NEJMoa1414905
32. Stafford SL, Perry A, Suman VJ, Meyer FB, Scheithauer BW, Lohse CM, et al. Primarily resected meningiomas: outcome and prognostic factors in 581 Mayo Clinic patients, 1978 through (1988). *Mayo Clin Proc.* (1998) 73:936–42. doi: 10.4065/73.10.936

33. Morales-Valero SF, Van Gompel JJ, Loumiotis I, Lanzino G. Craniotomy for anterior cranial fossa meningiomas: historical overview. *Neurosurg Focus.* (2014) 36:E14. doi: 10.3171/2014.1.FOCUS13569
34. Da Silva EB Jr, Milano JB, da Silva LFM Jr, Aurich LA, Ramina R. *Neuronavigation for Intracranial Meningiomas.* London: IntechOpen. (2012). p. 65–84.
35. Willems PWA, van der Sprenkel JWB, Tulleken CAF, Viergever MA, Taphoorn MJB. Neuronavigation and surgery of intracerebral tumours. *J Neurol.* (2006) 253:1123–36. doi: 10.1007/s00415-006-0158-3
36. Pia HW. The microscope in neurosurgery—technical improvements. *Acta Neurochir (Wien).* (1972) 26:251–5. doi: 10.1007/BF01406557
37. Runnels JB. Microneurosurgery. The use of the operating binocular microscope. *J Kans Med Soc.* (1974) 75:40–41
38. Barnett GH, Steiner CP, Weisenberger J. Intracranial meningioma resection using frameless stereotaxy. *J Image Guid Surg.* (1995) 1:46–52. doi: 10.1002/(SICI)1522-712X(1995)1:1<46::AID-IGS7>3.0.CO;2-M
39. Jallo GI. CUSA EXcel ultrasonic aspiration system. *Neurosurgery.* (2001) 48:695–7. doi: 10.1097/00006123-200103000-00054
40. Ramazanov R, Dreval ON, Akatov OV, Zaretsky AA. Ultrasound microneurosurgery. *Neurol Res.* (1999) 21:73–6. doi: 10.1080/01616412.1999.11740896

41. Tang H, Zhang H, Xie Q, Gong Y, Zheng M, Wang D, et al. Application of CUSA Excel ultrasonic aspiration system in resection of skull base meningiomas. *Chin J Cancer Res.* (2014) 26:653–7.
42. Shah A, Choudhri O, Jung H, Li G. Preoperative endovascular embolization of meningiomas: update on therapeutic options. *Neurosurg Focus.* (2015) 38:E7. doi: 10.3171/2014.12.FOCUS14728
43. Bailo M, Gagliardi F, Boari N, Castellano A, Spina A, Mortini P. The role of surgery in meningiomas. *Curr Treat Options Neurol.* (2019) 21:51. doi: 10.1007/s11940-019-0587-9
44. Wadley J, Dorward N, Kitchen N, Thomas D. Pre-operative planning and intra-operative guidance in modern neurosurgery: a review of 300 cases. *Ann R Coll Surg Engl.* (1999) 81:217–25.
45. Paleologos TS, Wadley JP, Kitchen ND, Thomas DG. Clinical utility and cost-effectiveness of interactive image-guided craniotomy: clinical comparison between conventional and image-guided meningioma surgery. *Neurosurgery.* (2000) 47:40–7; discussion 47–48. doi: 10.1227/00006123-200007000-00010
46. Binnewies, M., E. W. Roberts, K. Kersten, V. Chan, D. F. Fearon, M. Merad, L. M. Coussens, D. I. Gabrilovich, S. Ostrand-Rosenberg, C. C. Hedrick, R. H. Vonderheide, M. J. Pittet, R. K. Jain, W. Zou, T. K. Howcroft, E. C. Woodhouse, R. A. Weinberg, and M. F. Krummel. 2018. 'Understanding the tumor immune microenvironment (TIME) for effective therapy', *Nat Med*, 24: 541-50.

47. DeMonte Franco, Michael W. McDermott, Ossama Al-Mefty. Al-Mefty's Meningiomas. Thieme Medical Publishers, Inc. New York. 2011.
48. Park HJ, Kang H-C, Kim IH, Park S-H, Kim DG, Park C-K, et al. The role of adjuvant radiotherapy in atypical meningioma. *J Neurooncol.* (2013) 115:241–7. doi: 10.1007/s11060-013-1219-y
49. Wang Y-C, Chuang C-C, Wei K-C, Chang C-N, Lee S-T, Wu C-T, et al. Long term surgical outcome and prognostic factors of atypical and malignant meningiomas. *Sci Rep.* (2016) 6:35743. doi: 10.1038/srep35743
50. Komotar RJ, Iorgulescu JB, Raper DMS, Holland EC, Beal K, Bilsky MH, et al. The role of radiotherapy following gross-total resection of atypical meningiomas. *J Neurosurg.* (2012) 117:679–86. doi: 10.3171/2012.7.JNS112113
51. Huffmann BC, Reinacher PC, Gilsbach JM. Gamma knife surgery for atypical meningiomas. *J Neurosurg.* (2005) 102(Suppl):283–6. doi: 10.3171/jns.2005.102.s\_supplement.0283
52. Winkler C, Dornfeld S, Schwarz R, Friedrich S, Baumann M. [The results of radiotherapy in meningiomas with a high risk of recurrence. A retrospective analysis]. *Strahlenther Onkol.* (1998) 174:624–8. doi: 10.1007/BF03038510
53. Fowler JF, Tomé WA, Fenwick JD, Mehta MP. A challenge to traditional radiation oncology. *Int J Radiat Oncol Biol Phys.* (2004) 60:1241–56. doi: 10.1016/j.ijrobp.2004.07.691




54. Jo K, Park H-J, Nam D-H, Lee J-I, Kong D-S, Park K, et al. Treatment of atypical meningioma. *J Clin Neurosci.* (2010) 17:1362–6. doi: 10.1016/j.jocn.2010.03.036
55. Hasan S, Young M, Albert T, Shah AH, Okoye C, Bregy A, et al. The role of adjuvant radiotherapy after gross total resection of atypical meningiomas. *World Neurosurg.* (2015) 83:808–15. doi: 10.1016/j.wneu.2014.12.037
56. Violaris K, Katsarides V, Sakellariou P. The Recurrence Rate in Meningiomas: Analysis of Tumor Location, Histological Grading, and Extent of Resection. *Open Journal of Modern Neurosurgery.* 2013; 2:6-10.
57. Zhao P, Hu M, Zhao M, Ren X, Jiang Z. Prognostic factors for patients with atypical or malignant meningiomas treated at a single center. *Neurosurg Rev* 2015;38:101-7; discussion 107. 22.
58. Choi Y, Lim DH, Jo K, Nam DH, Seol HJ, Lee JI. Efficacy of postoperative radiotherapy for high grade meningiomas. *J Neurooncol* 2014;119: 405-12. 23.
59. McCarthy BJ, Davis FG, Freels S, Surawicz TS, Damek DM, Grutsch J, et al. Factors associated with survival in patients with meningioma. *J Neurosurg* 1998;88:831-9. 25.
60. Pollock BE, Stafford SL, Link MJ, Garces YI, Foote RL. Stereotactic radiosurgery of World Health Organization grade II and III intracranial meningiomas: treatment results on the basis of a 22-year experience. *Cancer* 2012;118:1048-54


61. Qin S, Sun X and He J (2022) Predicting the grade of meningiomas by clinical–radiological features: A comparison of precontrast and postcontrast MRI. *Front. Oncol.* 12:1053089. doi: 10.3389/fonc.2022.1053089
62. Cain SA, Smoll NR, Van Heerden J, Tsui A, Drummond KJ. Atypical and malignant meningiomas: considerations for treatment and efficacy of radiotherapy. *J Clin Neurosci* 2015;22:1742
63. Hale AT, Wang L, Strother MK, Chambless LB. Differentiating meningioma grade by imaging features on magnetic resonance imaging. *J Clin Neurosci* 2018;48:71-5.
64. Chernov MF, Kasuya H, Nakaya K, Kato K, Ono Y, Yoshida S, et al. <sup>1</sup>H-MRS of intracranial meningiomas: what it can add to known clinical and MRI predictors of the histopathological and biological characteristics of the tumor? *Clin Neurol Neurosurg* 2011;113:202-12.

## Lampiran

### 1. Ethical clearance



KOMITE ETIK PENELITIAN  
KESEHATAN *HEALTH RESEARCH*  
*ETHICS COMMITTEE* RSUP DR.  
KARIADI SEMARANG  
**KETERANGAN LAYAK ETIK**  
*DESCRIPTION OF ETHICAL*  
*APPROVAL*  
**"ETHICAL APPROVAL"**  
No.1674/EC/KEPK-RSDK/2024



RSUP Dr. KARIADI  
Sesuai Misi Kita

Protokol penelitian yang diusulkan oleh :  
*The research protocol proposed by*

Pencetus utama : dr. Fariz Eka Setiawan  
*Principal In Investigator*

Nama Institusi : PPDS BEDAH SARAF FK UNDIP  
*Title*

**"Karakteristik Klinik, Faktor Prognosis Dan Survival Outcome Pada Meningioma Anaplastik"**


Dinyatakan layak etik sesuai 7 (tujuh) Standar WHO 2011, yaitu 1) Nilai Sosial, 2) Nilai Ilmiah, 3) Pemerataan Beban dan Manfaat, 4) Risiko, 5) Bujukan/Eksploitasi, 6) Kerahasiaan dan Privacy, dan 7) Persetujuan Setelah Penjelasan, yang merujuk pada Pedoman CIOMS 2016. Hal ini seperti yang ditunjukkan oleh terpenuhinya indikator setiap standar.

*Declared to be ethically appropriate in accordance to 7 (seven) WHO 2011 Standards, 1) Social Values, 2) Scientific Values, 3) Equitable Assessment and Benefits, 4) Risks, 5) Persuasion/Exploitation, 6) Confidentiality and Privacy, and 7) Informed Consent, referring to the 2016 CIOMS Guidelines. This is as indicated by the fulfillment of the indicators of each standard.*

Pernyataan Layak Etik ini berlaku selama kurun waktu tanggal 01 Februari 2024 sampai dengan tanggal 01 Februari 2025.

*This declaration of ethics applies during the period 01 February, 2024 until 01 February, 2025.*

01 February, 2024  
Professor and Chairperson,



Dr. dr. Eko Adhi Pangarsa, Sp.PD KHOM