

References

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1. Adeberg S, Harrabi SB, Bougatf N, et al. Intensity-modulated proton therapy, volumetric-modulated arc therapy, and 3D conformal radiotherapy in anaplastic astrocytoma and glioblastoma: a dosimetric comparison. *Strahlenther Onkol.* 2016;192(11):770-779.
2. Allen AM, Pawlicki T, Dong L, et al. An evidence based review of proton beam therapy: the report of ASTRO's emerging technology committee. *Radiother Oncol.* 2012;103(1):8-11.
3. American Society for Radiation Oncology Model Policies. Proton Beam Therapy (PBT). 2017 June.
4. Amichetti M, Amelio D, Cianchetti M, et al. A systematic review of proton therapy in the treatment of chondrosarcoma of the skull base. *Neurosurg Rev.* 2010;33(2):155-165.
5. Amichetti M, Cianchetti M, Amelio D et al. Proton therapy in chordoma of the base of the skull: a systematic review. *Neurosurg Rev.* 2009;32(4):403-16.
6. ASTRO release list of five radiation oncology treatments to question as part of national Choosing Wisely® campaign. 2013 Sep 13.
7. Athar BS, Paganetti H. Neutron equivalent doses and associated lifetime cancer incidence risks for head & neck and spinal proton therapy. *Phys Med Biol.* 2009;54(16):4907-4926.
8. Barker FG 2nd, Butler WE, Lyons S, et al. Dose-volume prediction of radiation-related complications after proton beam radiosurgery for cerebral arteriovenous malformations. *J Neurosurg.* 2003;99(2):254-263.
9. Bekelman JE, Schultheiss T, Berrington De Gonzalez A. Subsequent malignancies after photon versus proton radiation therapy. *Int J Radiat Oncol Biol Phys.* 2013;87(1):10-12.
10. Berrington de Gonzalez A, Gilbert E, Curtis R, et al. Second solid cancers after radiation therapy: a systematic review of the epidemiologic studies of the radiation dose-response relationship. *Int J Radiat Oncol Biol Phys.* 2013;86(2):224-233.
11. Boskos C, Feuvret L, Noel G, et al. Combined proton and photon conformal radiotherapy for intracranial a typical and malignant meningioma. *Int J Radiat Oncol Biol Phys.* 2009;75(2): 399-406.
12. Brada M, Pijls-Johannesma M, De Ruysscher D. Current clinical evidence for proton therapy. *Cancer J.*
13. Brada M, Pijls-Johannesma M, De Ruysscher D. Proton therapy in clinical practice: current clinical evidence. *J Clin Oncol.* 2007;25(8):965–970.

14. Brenner DJ, Hall EJ. Secondary neutrons in clinical proton radiotherapy: a charged issue. *Radiother Oncol.* 2008;86(2):165-70.
15. Bush DA, McAllister CJ, Loredo LN et al. Fractionated proton beam radiotherapy for acoustic neuroma. *Neurosurgery.* 2002;50(2): 270-275.
16. Chan AW, Liebsch NJ. Proton radiation therapy for head and neck cancer. *J Surg Oncol.* 2008;97(8):697-700.
17. Chang JY, Komaki R, Lu C, et al. Phase 2 study of high-dose proton therapy with concurrent chemotherapy for unresectable stage III nonsmall cell lung cancer. *Cancer.* 2011;117(20):4707-4713.
18. Char DH, Kroll S, Phillips TL, et al. Late radiation failures after iodine 125 brachytherapy for uveal melanoma compared with charged-particle (proton or helium ion) therapy. *Ophthalmology.* 2002;109(10):1850-1854.
19. Chung CS, Yock TI, Nelson K, et al. Incidence of second malignancies among patients treated with proton versus photon radiation. *Int J Radiat Oncol Biol Phys.* 2013;87(1):46-52.
20. ClinicalTrials.gov. Glioblastoma multiforme (GBM) proton vs. intensity modulated radiotherapy (IMRT). NCT01854554, Last updated August 15, 2017.
21. ClinicalTrials.gov. Proton radiotherapy for stage I, IIA, and IIB seminoma, NCT01557790, Last Updated
22. Coen JJ, Bae K, Zietman AL, et al. Acute and late toxicity after dose escalation to 82 GyE using conformal proton radiation for localized prostate cancer: initial report of American College of Radiology Phase II study 03- 12. *Int J Radiat Oncol Biol Phys.* 2011;81(4):1005-1009.
23. Conway RM, Poothullil AM, Daftari IK, et al. Estimates of ocular and visual retention following treatment of extra-large uveal melanomas by proton beam radiotherapy. *Arch Ophthalmol.* 2006;124(6):838-843.
24. De Ruysscher D, Lodge MM, Jones B, et al. Charged particles in radiotherapy: a 5-year update of a systemic review. *Radiother and Oncol.* 2012;103(1):5-7.
25. Debus J, Schulz-Ertner D, Schad L, et al. Stereotactic fractionated radiotherapy for chordomas and chondrosarcomas of the skull base. *Int J Radiat Oncol Biol Phys.* 2000;47(3):591-596.
26. Desjardins L, Lumbroso-Le Rouic L, Levy-Gabriel C, et al. Combined proton beam radiotherapy and transpupillary thermotherapy for large uveal melanomas: a randomized study of 151 patients. *Ophthalmic Res.* 2006;38(5):255–260.
27. Eaton BR, MacDonald SM, Yock TI, et al. Secondary malignancy risk following proton radiation therapy. *Front Oncol.* 2015;5:261.
28. Efstathiou JA, Trofimov AV, Zietman AL. Life, liberty, and the pursuit of protons: an evidence-base review of the role of particle therapy in the treatment of prostate cancer. *The Cancer J.* 2009;15(4):312-318.

29. Egger E, Zografos L, Schalenbourg A, et al. Eye retention after proton beam radiotherapy for uveal melanoma. *Int J Radiat Oncol Biol Phys.* 2003;55(4):867-880.
30. Fitzek MM, Thornton AF, Harsh GT, et al. Dose-escalation with proton/photon irradiation for Daumas-Duport lower-grade glioma: results of an institutional phase I/II trial. *Int J Radiat Oncol Biol Phys.* 2001;51(1):131- 137.
31. Fitzek MM, Thornton AF, Rabinov JD, et al. Accelerated fractionated proton/photon irradiation to 90 cobalt gray equivalent for glioblastoma multiforme: results of a phase II prospective trial. *J Neurosurg.* 1999;91(2):251- 260.
32. Fukumitsu N, Sugahara S, Nakayama H, et al. A prospective study of hypofractionated proton beam therapy for patients with hepatocellular carcinoma. *Int J Radiat Oncol Biol Phys.* 2009;74(3):831-836.
33. Grutters JPC, Kessels AGH, Pijls-Johannesma M, et al. Comparison of the effectiveness of radiotherapy with photons, protons and carbon-ions for non-small cell lung cancer: a meta-analysis. *Radiother Oncol.* 2010;95(1):32-40.
34. Gunther JR, Sato M, Chintagumpala M, et al. Imaging changes in pediatric intracranial ependymoma patients treated with proton beam radiation therapy compared to intensity modulated radiation therapy. *Int J Radiat Oncol Biol Phys.* Published online: 2015.
35. Hasegawa T, Ishii D, Kida Y, et al. Gamma Knife surgery for skull base chordomas and chondrosarcomas. *J Neurosurg.* 2007;107(4):752-757.
36. Hashimoto T, Tokuuye K, Fukumitsu N, et al. Repeated proton beam therapy for hepatocellular carcinoma. *Int J Radiat Oncol Biol Phys.* 2006;65(1):196-202
37. Hata M, Tokuuye K, Sugahara S, et al. Proton beam therapy for hepatocellular carcinoma patients with severe cirrhosis. *Strahlenther Onkol.* 2006;182(12):713-720.
38. Hata M, Tokuuye K, Sugahara S et al. Proton beam therapy for hepatocellular carcinoma with portal vein tumor thrombus. *Cancer.* 2005;104(4):794-801.
39. Holliday EB, Frank SJ. Proton radiation therapy for head and neck cancer: a review of the clinical experience to date. *Int J Radiat Oncol Biol Phys.* 2014;89(2):292-302.
40. Hoppe BS, Flampouri S, Henderson RH, et al. Proton therapy with concurrent chemotherapy for nonsmall-cell lung cancer: technique and early results. *Clin Lung Cancer.* 2012;13(5):352-358.
41. Hoppe BS, Mamalui-Hunter M, Mendenhall NP, et al. Improving the therapeutic ratio by using proton therapy in patients with stage I or stage II seminoma. *Am J Clin Oncol.* 2013;36(1):31-37.

42. Hoppe BS, Michalski JM, Mendenhall NP, et al. Comparative effectiveness study of patient-reported outcomes after proton therapy or intensity-modulated radiotherapy for prostate cancer. *Cancer*. 2014;120(7):1076- 1085.
43. Horwich A, Fossa SD, Huddart R, et al. Second cancer risk and mortality in men treated with radiotherapy for stage I seminoma. *Brit J Cancer*. 2014;110 (1): 256-263.
44. Hsiung-Stripp DC, McDonough J, Masters HM, et al. Comparative treatment planning between proton and xray therapy in pancreatic cancer. *Med Dosim*. 2001;26(3):255-259
45. Hutcheson K, Lewin JS, Garden AS, et al. Early experience with IMPT for the treatment of oropharyngeal tumors: acute toxicities and swallowing-related outcomes. *Int J Radiat Oncol Biol Phys*. 2013 Oct 1; 87(2 Suppl):S605.
46. Jiang ZQ, Yang K, Komaki R, et al. Long-term clinical outcome of intensity-modulated radiotherapy for inoperable non-small cell lung cancer: The MD Anderson experience. *Int J Radiat Oncol Biol Phys*. 2012;83(1):332-339.
47. Kollmeier MA, Fidaleo A, Pei X, et al. Favourable long-term outcomes with brachytherapy-based regimens in men \leq 60 years with clinically localized prostate cancer. *BJU Int*. 2013;111(8):1231-1236.
48. Kotecha R, Yamada Y, Pei X, et al. Clinical outcomes of high-dose-rate brachytherapy and external beam radiotherapy in the management of clinically localized prostate cancer. *Brachytherapy*. 2013;12(1):44- 49.
49. Koyama S, Tsujii H. Proton beam therapy with high-dose irradiation for superficial and advanced esophageal carcinomas. *Clin Cancer Res*. 2003;9(10 Pt 1):3571-3577.
50. Kozak KR, Kachnic LA, Adams J, et al. Dosimetric feasibility of hypofractionated proton radiotherapy for neoadjuvant pancreatic cancer treatment. *Int J Radiat Oncol Biol Phys*. 2007;68(5):1557-1566.
51. Lewinshtein D, Gulati R, Nelson PS et al. Incidence of second malignancies after external beam radiotherapy for clinical stage I testicular seminoma. *BJU International*. 2012;109(5):706-712.
52. Lumbroso-Le Rouic L, Delacroix S, Dendale R, et al. Proton beam therapy for iris melanomas. *Eye*. 2006; 20(12):1300-1305.
53. Luu QT, Loredo LN, Archambeau JO, et al. Fractionated proton radiation treatment for pediatric craniopharyngioma: preliminary report. *Cancer J*. 2006;12(2):155-159.
54. Macdonald JS, Smalley SR, Benedetti J, et al. Chemoradiotherapy after surgery compared with surgery alone for adenocarcinoma of the stomach or gastroesophageal junction. *N Engl J Med*. 2001;345(10):725-730.
55. Mazonakis M, Berris T, Lyraraki E et al. Radiation therapy for stage IIA and IIB testicular seminoma: peripheral dose calculations and risk assessments. *Physics in Medicine and Biology*. 2015;60(6):2375-2390.

- 56.Mendenhall NP, Hoppe BS, Nichols RC, et al. Five-year outcomes from 3 prospective trials of imageguided proton therapy for prostate cancer. *Int J Radiat Oncol Biol Phys.* 2014;88(3):596-602.
- 57.Mizumoto M, Yamamoto Y, Takano S, et al. Long-term survival after treatment of glioblastoma multiforme with hyperfractionated concomitant boost proton beam therapy. *Pract Radiat Oncol.* 2015;5(1):e9-e16.
- 58.Mohan R, Grosshans D. Proton therapy – present and future. *Adv Drug Deliv Rev.* 2017;109:26-44.
- 59.Moteabbed M, Geyer A, Drenkhahn R, et al. Comparison of whole-body phantom designs to estimate organ equivalent neutron doses for secondary cancer risk assessment in proton therapy. *Phys Med Biol.* 2012;57(2):499-515.
- 60.Murphy ES, Suh JH. Radiotherapy for vestibular schwannomas: a critical review. *Int J Radiat Oncol Biol Phys.* 2011;79(4):985-997.
- 61.National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2017 – February 21, 2017. Prostate Cancer.
- 62.National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2017 – December 8, 2016. Testicular Cancer.
- 63.Noël G, Feuvret L, Calugaru V et al. Chordomas of the base of the skull and upper cervical spine. One hundred patients irradiated by a 3D conformal technique combining photon and proton beams. *Acta Oncol.* 2005;44(7):700–708.
- 64.Olsen DR, Bruland ØS, Frykholm G, et al. Proton therapy – a systematic review of clinical effectiveness. *Radiother Oncol.* 2007;83(2):123–132.
- 65.Peeler CR, Mirkovic D, Titt U, et al. Clinical evidence of variable proton biological effectiveness in pediatric patients treated for ependymoma. *Radiother Oncol.* 2016;121(3):395-401.
- 66.Ramakrishna NR, Harper B, Burkavage R, et al. A comparison of brain and hippocampal dosimetry with protons or intensity modulated radiation therapy planning for unilateral glioblastoma. *Int J Radiat Oncol Biol Phys.* 2016;96(2 Suppl):e134-e135.
- 67.Radiation Therapy Oncology Group (RTOG). RTOG 1308 Protocol Information. Phase III Randomized Trial Comparing Overall Survival After Photon Versus Proton Chemoradiotherapy for Inoperable Stage II-IIIB NSCLC.
- 68.Richie JP. Editorial Comment. Re: Incidence of second malignancies after external beam radiotherapy for clinical stage I testicular seminoma. *J of Urology.* 2012;188(6):2231-2232.
- 69.Ronson BB, Schulte RW, Han KP, et al. Fractionated proton beam irradiation of pituitary adenomas. *Int J Radiat Oncol Biol Phys.* 2006;64(2):425-434.
- 70.Rowe J, Grainger A, Walton L et al. Risk of malignancy after gamma knife stereotactic radiosurgery. *Neurosurgery.* 2007;60(1):60-65.

71. Sheets NC, Goldin GH, Meyer AM, et al. Intensity-modulated radiation therapy, proton therapy, or conformal radiation therapy and morbidity and disease control in localized prostate cancer. *JAMA*. 2012;307(15):1611-1620.
72. Shih HA, Arvold ND, Niemierko A, et al. Second tumor risk and projected late effects after proton vs. intensity modulated photon radiotherapy for benign meningioma: a dosimetric comparison. *Int J Radiat Oncol Biol Phys*. 2010;78(3): S272.
73. Simone II CB, Kramer K, O'Meara WP et al. Predicted rates of secondary malignancies from proton versus photon radiation therapy for stage I seminoma. *Int J Radiat Oncol Biol Phys*. 2012;82(1): 242-249.
74. Spratt DE, Pei X, Yamada J, et al. Long-term survival and toxicity in patients treated with high-dose intensity modulated radiation therapy for localized prostate cancer. *Int J Radiat Oncol Biol Phys*. 2013;85(3):686-92.
75. Steneker M, Lomax A, Schneider U. Intensity modulated photon and proton therapy for the treatment of head and neck tumors. *Radiother Oncol*. 2006;80(2):263-267.
76. Sugahara S, Oshiro Y, Nakayama H, et al. Proton beam therapy for large hepatocellular carcinoma. *Int J Radiat Oncol Biol Phys*. 2010;76(2):460-466.
77. Sugahara S, Tokuuye K, Okumura T, et al. Clinical results of proton beam therapy for cancer of the esophagus. *Int J Radiat Oncol Biol Phys*. 2005;61(1):76-84.
78. Tommasino F, Durante M. Proton radiobiology. *Cancers*. 2015;7(1):353-381.
79. Travis LB, Curtis RE, Faumeni Jr. JF et al. Risk of second malignant neoplasms among long-term survivors of testicular cancer. *J Natl Cancer Inst*. 1997;89(19): 1429-1439.
80. Travis LB, Fossa SD, Schonfield SJ, et al. Second cancers among 40,576 testicular cancer patients: focus on long-term survivors. *J Natl Cancer Inst*. 2005;97(18); 1354-1365.
81. Weber DC, Chan AW, Bussiere MR, et al. Proton beam radiosurgery for vestibular schwannoma: tumor control and cranial nerve toxicity. *Neurosurgery*. 2003;53(3):577-588.
82. Yu JB, Soullos PR, Herrin J et al. Proton versus intensity-modulated radiotherapy for prostate cancer: patterns of care and early toxicity. *J Natl Cancer Inst*. 2013;105(1):25-32
83. Zacharatou Jarlskog C, Paganetti H. Risk of developing second cancer from neutron dose in proton therapy as function of field characteristics, organ, and patient age. *Int J Radiat Oncol Biol Phys*. 2008;72(1):228-235.
84. Zelefsky MJ, Pei X, Teslova T, et al. Secondary cancers after intensity-modulated radiotherapy, brachytherapy and radical prostatectomy for the treatment of prostate cancer: incidence and causespecific survival outcomes

- according to the initial treatment intervention. *BJU Int.* 2012;110(11):1696-701.
85. Zhang X, Zhao KL, Guerrero TM, et al. Four-dimensional computed tomography-based treatment planning for intensity-modulated radiation therapy and proton therapy for distal esophageal cancer. *Int J Radiat Oncol Biol Phys.* 2008;72(1):278-287.
86. Zietman AL, Bae K, Slater JD, et al. Randomized trial comparing conventional-dose with high-dose conformal radiation therapy in early-stage adenocarcinoma of the prostate: long-term results from Proton Radiation Oncology Group/American College of Radiology 95-09. *J Clin Oncol.* 2010;28(7):1106-1111.
87. Zorlu F, Gurkaynak M, Yildiz F et al. Conventional external radiotherapy in the management of clivus chordomas with overt residual disease. *Neurol Sci.* 2000;21(4):203–207.
88. Zurlo A, Lomax A, Hoess A, et al. The role of proton therapy in the treatment of large irradiation volumes: a comparative planning study of pancreatic and biliary tumors. *Int J Radiat Oncol Biol Phys.* 2000;48(1):277-288.
89. Evincore Clinical Guidelines, Radiation Oncology Version 1.0 January 1, 2020.