Clinical Outcomes for Stereotactic Radiosurgery for Central Neurocytoma

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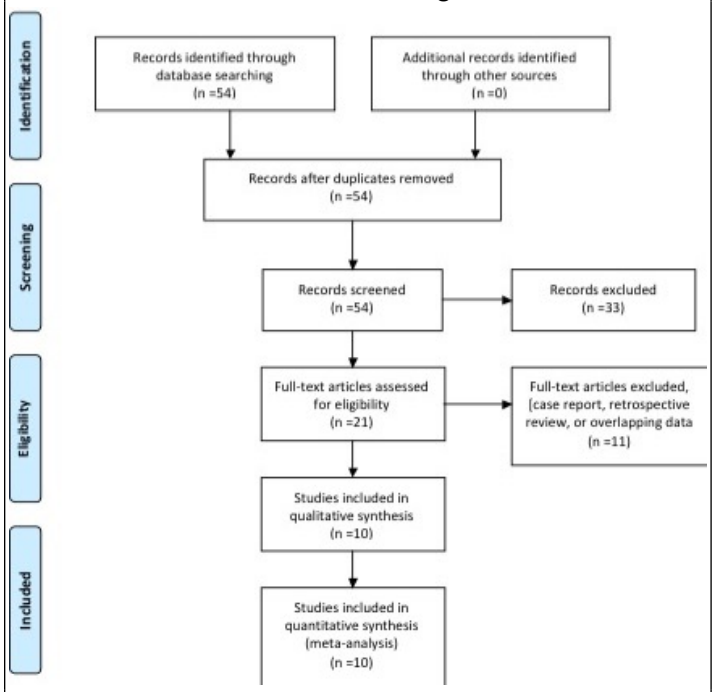
Introduction

Central neurocytoma (CN) typically presents as an intraventricular mass causing symptomatic obstructive hydrocephalus. As such, the first line of treatment is surgical resection. Gross total resection is achieved in 60-100% of microsurgeries; recurrence occurs in 20% of patients. Because of a relatively high recurrence rate, conventional radiotherapy (cRT) was initially used as an adjuvant therapy. Stereotactic radiosurgery (SRS) was proposed as an alternative adjuvant or even primary treatment because of its lower risks.

Methods

A systematic analysis for CN treated with SRS conducted in PubMed. Reported patient raw data was aggregated and analyzed for tumor local control rate and 95% CI. Heterogeneity and publication bias were also assessed.

PRISMA Flow Diagram



Moher et al. 2009. PLoS Med 6(7):e1000097.

Results

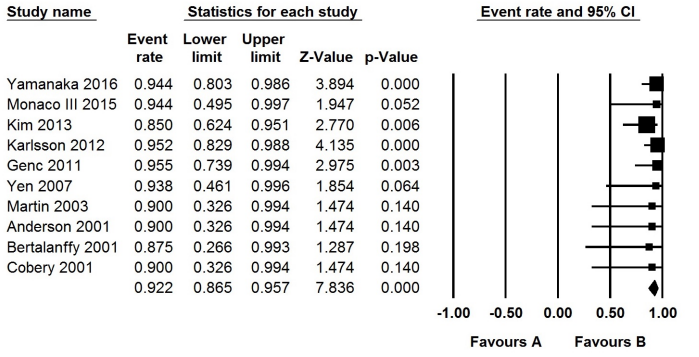
The estimated cumulative rate of tumor control was 92.2% (95% CI=86.5%-95.7%). Mean follow-up time was 62 months (range 3-141 months). P-value under random-effect model was < 0.0001. Heterogeneity and publication bias were not significant among eligible studies.

Table 1. Literature review of SRS for central neurocytoma

Author and year	# Pts	Mean Age (yrs)	Modality	MTV (mL)	Mean Dose (Gy)	F/U (months)	Recurrence	LC	DC	OS	Complications
Yamanaka K, 2016	36	35.0	GKRS	4.9*	15*	54.5*	88%	94%	92%	97%	tumor hemorrhage x2, radiation injury x1
Monaco III EA, 2015	8	29.0	GKRS	5.5	14.6	63.3	88%	100%	88%	100%	-
Kim JW, 2013	20	32.0	GKRS	11.0	15.4	103	70%	85%	85%	100%	edema x1
Karlsson B, 2012	42	32.0	GKRS	12.0	13.0	73	91%	95%	95%	100%	edema x1
Genc A, 2011	22	30.2	GKRS	13.4	16.4	36	95%	95%	100%	100%	-
Yen CP, 2007	7	26.7	GKRS	6.0	16.0	60	100%	100%	100%	86%	tumor hemorrhage x1
Martin JM, 2003	4	26.3	LINAC	3.2	16.5	33	100%	100%	100%	100%	alopecia, edema, necrosis x1
Anderson RC, 2001	4	28.3	GKRS	7.0	17.0	17	100%	100%	100%	100%	-
Bertalanffy A, 2001	3	22.3	GKRS	3.9	12.8	60	100%	100%	100%	67%	death via pericarditis x1
Cobery ST, 2001	4	27.5	GKRS	14.8	10.5	44	100%	100%	100%	100%	-
Total	150		97% GKRS 3% LINAC								
Mean		31.5		9.3	14.7	62	89%	94%	94%	98%	

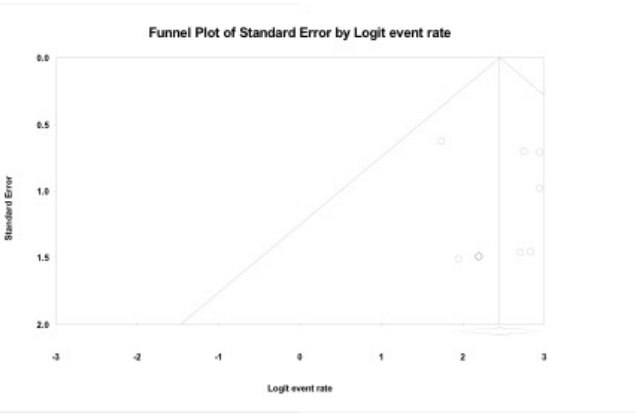
*median. Pts=patients; yrs=years; GKRS=gamma knife radiosurgery; LINAC=linear accelerator; MTV=mean tumor volume; Gy=Gray; F/U=follow-up; LC=local control; DC=distant control; OS=overall survival.

Forest Plot



Local control rate of CN after SRS. Comprehensive Meta-Analysis v3.0.

Funnel Plot



Publication bias of included studies.

Conclusions

Our data suggests that SRS may be an effective and safe alternative therapy for CN. However, the rarity of CN still limits the efficacy of a quantitative analysis. A future multi-institutional randomized trial of CN patients should be considered to further elucidate this therapy.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the importance of determining adjuvant therapy efficacy for central neurocytoma, 2) Discuss, in small groups, the benefits of stereotactic radiosurgery over conventional radiotherapy for treatment of central neurocytoma, 3) Identify an effective treatment for recurrent or residual central neurocytoma.