Increased risk of breast cancer brain metastasis with EGFR and Ki-67 expression: a systematic review and meta-analysis

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Background

- Breast cancer is the 2nd most frequent cancer and the most common female cancer globally.
- Brain metastasis is the end-stage in breast cancer progression.
- Poor prognosis with local therapies and rising incidence of BCBM highlights the need for better prediction of BCBM through precision medical care.

Methods

- Systematic review conducted in PubMed, Embase, Web of Science, and Cochrane for relevant literature until October 2018.
- Initial abstract/title screen conducted in duplicate, studies excluded based on exclusion criteria.
- Full text studies screened and reviewed in duplicate.
- Studies selected for data extraction based on inclusion criteria.
- Data extracted and reviewed in duplicate.
- Qualitative and quantitative analysis performed.

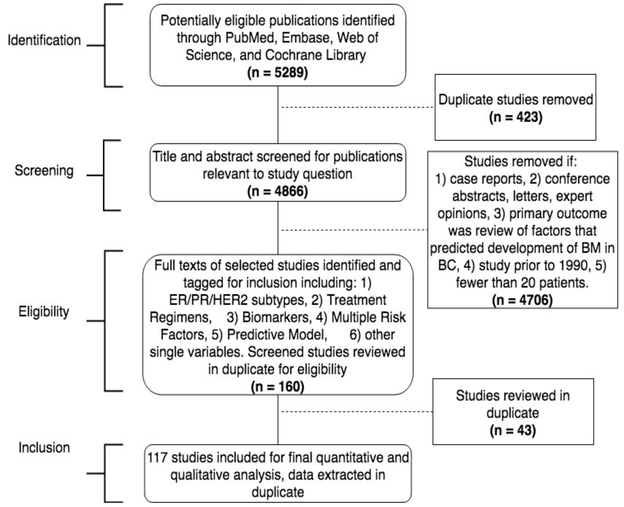

Figure 1: Flow chart of articles selected for systematic review and meta-analysis process

Results

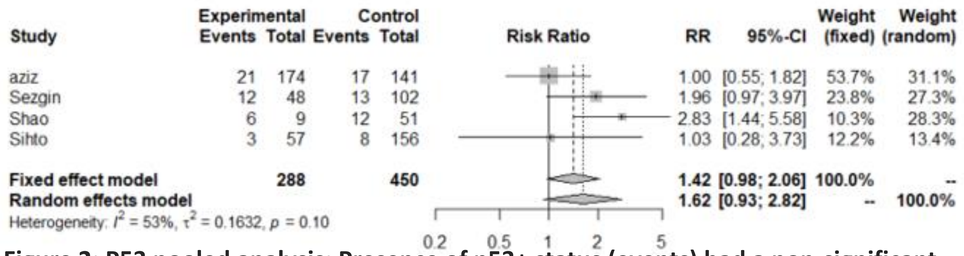

Figure 2: P53 pooled analysis: Presence of p53+ status (events) had a non-significant elevated relative risk for BCBM.

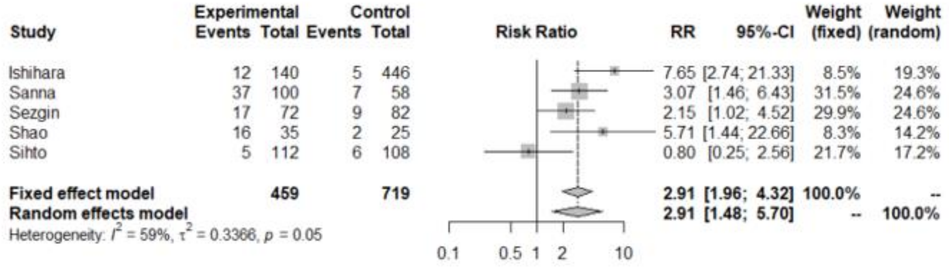

Figure 3: Ki-67 pooled analysis. High Ki-67 expression had a higher relative risk for BCBM.

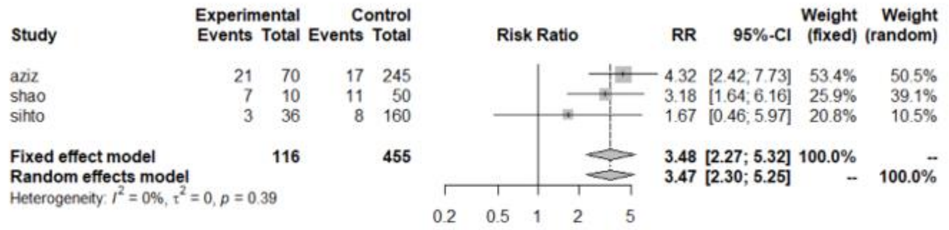

Figure 4: EGFR pooled analysis. Presence of EGFR+ status (events) had a higher relative risk for BCBM.

Biomarker	Nr. of papers
Neuron specific enolase	1
matrix metalloproteinase	1
CEA	1
CA 15-3	1
SNPs	1
COX2	1
Nestin	1
Ck18	1
E-cadherin	1
KIT	1
GATA3	1
RANKL	1
androgen receptor	1
3q gene signature	1
Slit/Robo	1
Hyal1	1

Figure 5: Other biomarkers identified during systematic review of the literature.

Conclusions

- This study summarizes the various biomarkers studied in the literature as they relate to BCBM.
- Greater risk for BCBM is associated with EGFR+ expressivity and high Ki-67 expression when data is analyzed under pooled analysis.
- P53 did not appear to increase relative risk for BCBM under pooled analysis.
- Further studies are needed to better characterize the relative risk on BCBM in the three biomarkers reported and the other biomarkers identified in the literature.