The case of acoustic neuroma: Comment on: Mobile phone use and risk of brain neoplasms and other cancers

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Benson et al. recently published in this journal analyses of the Million Women Study to study tumour incidence in relation to the use of mobile phones. Based on their analyses of this exceptionally large and valuable cohort, the authors concluded that their study did not show any increased incidence of glioma, meningioma or non-CNS cancers. However, it is surprising that the important positive finding of their study showing a statistically significant increased risk of acoustic neuroma (relative risk (RR) 2.46, 95% confidence interval (CI) 1.07–5.64) with long-term (10+) use of mobile phones was not included in the conclusion section of the abstract and was only discussed after pooling with the Danish prospective cohort in the conclusion section of the paper.

This is surprising given that the finding provides further support for the Working Group of the IARC monograph programme conclusion to classify radio frequency electromagnetic fields as ‘possibly carcinogenic to humans’ (Group 2B) based on limited evidence from epidemiological studies for acoustic neuroma (and glioma, but not meningioma). The finding itself is further strengthened by an observed clear dose-response association; with RR = 1.00 (0.54–1.82) for <5 years of use, RR = 1.80 (1.08–3.03) for 5–9 years of use and finally RR = 2.46 for 10+ years of use.

The main argument for not interpreting these results as indicative of a causal association between long-term mobile phone use and increased risk of acoustic neuroma, even in the presence of a clear dose-response associations, is that after pooling the data from this study with those of the Danish prospective study, the pooled risk estimate is non-statistically significant with a RR of 1.16 [95% CI 0.75–1.81] for mobile phones use for at least 10 years. As outlined by the authors, the rationale for post hoc pooling of two studies from different populations was that both were prospective cohort studies that did not suffer from the recall bias in case-control studies: most notably the INTERPHONE study and work published by Hardell et al. However, the Danish prospective cohort is also not free from bias, most notably because of problems with correct identification of mobile phone subscribers between 1987 and 1995 (with all non-participants (42%), including business users, classified as ‘non-exposed’). These problems in the design of the Danish study will have biased any risk estimates towards the null, and pooling therefore has inevitably led to a reduction in the effect size; despite the strengths of the Million Women Study in itself. A common and more transparent approach would have been to conduct a meta-analysis of all available scientific papers (incorporating each study with its own strengths and weaknesses), instead of post hoc and selective pooling of data as done by Benson et al.

The epidemiological evidence on long-term (10+ years) use of mobile phones and risk of acoustic neuroma is summarized in Table 1, with the results of the random-effects meta-analysis also shown graphically in Figure 1. As shown, the accumulated scientific evidence remains inconclusive, but does indicate a 14–43% summary increased risk of acoustic neuroma because of long-term (10+ years) use of mobile phones, although without reaching statistical significance (95% CI 0.76–2.67).

In conclusion, in contrast to conclusions on acoustic neuroma by Benson et al., a meta-analytic approach indicates, in agreement with the conclusions from the IARC monograph programme, that long-term (10+ years) mobile phone use may lead to increased risk but, not surprisingly, that the evidence is not yet conclusive. Future prospective studies with improved exposure assessment using records of mobile phone
use, most notably the COSMOS study,11 will hopefully sway the cumulative results of the meta-analysis in a conclusive direction and settle this debate.

References


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