Interobserver variability in cause of death in a lung cancer screening trial: a pilot method study

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Background

A reliable process to determine cause of death (CoD) is important in the context of lung cancer screening trials to differentiate between all-cause and lung cancer related mortality. Previous lung cancer screening trials have used independent expert reviewers to report a consensus. Here, we adapt this method for a large lung cancer screening trial and report the interobserver agreement for cause of death, and the agreement with death certificates.

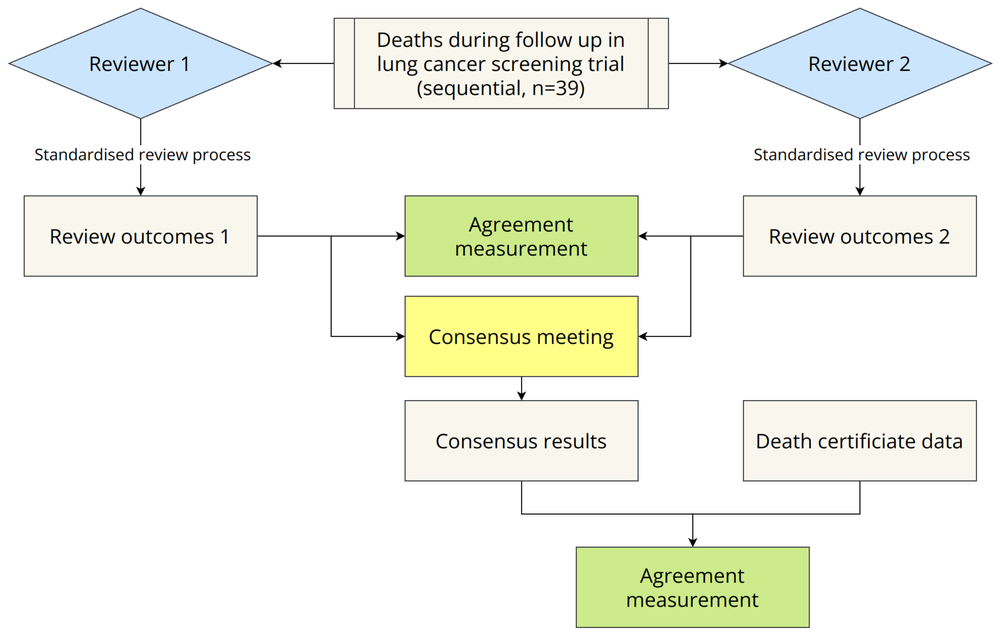
Methods

Patients diagnosed with cancer following baseline at lung cancer screen in the SUMMIT study (NCT03934866) who had died were selected sequentially. Two observers (respiratory registrars with minimum 4 years specialty training) independently conducted review of available clinical notes, including pathology reports, radiology reports, and blood results to determine lung cancer related CoD. Deaths were classed as ‘Definitely’, ‘Probable’, ‘Possible’, ‘Unlikely’, ‘Definitely Not’, and ‘Contributory to other CoD’ (adapted from [1]). After consensus review, the final rating was compared to medical certificates of cause of death, where CoD was classed as lung cancer related if lung cancer was listed in 1(a), 1(b) or 1(c).

Table 1. Interobserver agreement for lung cancer related cause of death

Lung cancer death	Reviewer 1	Reviewer 2	Agreement
	N = 39 (%)	N = 39 (%)	κ
Definitely or probable	24 (62)	21 (54)	0.84
- Definitely	11 (28)	11 (28)	0.37
- Probable	13 (33)	10 (26)	0.57
Possible	1 (3)	0	-
Unlikely	7 (18)	4 (10)	0.61
Definitely not	5 (13)	7 (18)	0.48
Contributory to other CoD	2 (5)	7 (18)	0.20

Figure 1. Flowchart overview of review process



Results

Thirty-nine patients were included, who had a mean age of 69 and were 51% male. Most cancers were stage 1 at diagnosis (51%), with the next most common being stage 3 (31%). Overall agreement between reviewers was moderate (Table 1). When ‘definitely’ and ‘probable’ were combined as lung cancer related deaths, and all other categories as non-lung cancer related death, agreement was excellent (κ=0.84). At review, 5/39 cases had disagreement between observers and were resolved by consensus. Agreement between reviewers and the death certificates was moderate (κ=0.54). The methods had agreement in 19/39 cases, and an equal number of lung cancer related deaths (23/39).

Conclusion

Independent blinded review to determine cause of death has excellent interobserver agreement. Robust definitions of lung cancer related mortality are important for trial endpoints. Independent cause of death review may provide more consistent definitions of lung cancer related death than death certificates.

References

[1] Horeweg, Nanda, et al. "Blinded and uniform cause of death verification in a lung cancer CT screening trial." *Lung Cancer* 77.3 (2012): 522-525.

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