Pre-Congress Symposium 1
Inflammation & Infection Committee
Saturday, October 12, 09:00-12:00

Session Title
Systematic Reviews and Meta-Analyses of Diagnostic Test Accuracy (DTA)

Chairpersons
Giorgio Treglia (Bellinzona, Switzerland)
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Programme

09:00 - 09:20	Giorgio Treglia (Bellinzona, Switzerland): Introduction to Systematic Reviews and Meta-Analyses of Diagnostic Test Accuracy
09:20 - 09:40	Giorgio Treglia (Bellinzona, Switzerland): Formulating the Review Question and Planning Eligibility Criteria
09:40 - 10:05	Barbara Muoio (Bellinzona, Switzerland): Systematic Search of Reports and Selection of Eligible Studies
10:05 - 10:15	Discussion
10:15 - 10:45	**Coffee Break**
10:45 - 11:05	Ramin Sadeghi (Mashhad, Iran): Collecting Data and Performing the Quality Assessment
11:05 - 11:30	Yemisi Takwoingi (Birmingham, United Kingdom): Pooling Indices Across Studies (Meta-Analysis)
11:30 - 11:50	Yemisi Takwoingi (Birmingham, United Kingdom): Analysis of Heterogeneity and Biases
11:50 - 12:00	Discussion

Educational Objectives
1. To underline the relevance of systematic reviews and meta-analyses of DTA in nuclear medicine.
2. To describe the formulation of a clear review question and the search strategy in systematic reviews and meta-analyses of DTA.
3. To describe the selection, data extraction and quality assessment of studies included in a systematic review or meta-analysis of DTA.
4. To illustrate the key elements of statistical analysis, evaluation of heterogeneity and biases, and preferred reporting of systematic reviews and meta-analyses of DTA.

Summary
A systematic review attempts to collate all empirical evidence that fits pre-specified eligibility criteria in order to answer a specific research question. It uses explicit, systematic methods that are selected with a view to minimizing bias, thus providing more reliable findings from which conclusions can be

drawn and decisions made. Meta-analysis is the use of statistical methods to summarize the results of independent studies. Systematic reviews and meta-analyses of diagnostic test accuracy (DTA) are very useful for approval of new diagnostic methods, health technology assessment (HTA) reports, planning new studies and evidence-based guidelines.

The first step of a systematic review/meta-analysis of DTA is formulating a clear review question and planning eligibility criteria. Components of a review question for systematic reviews/meta-analyses of DTA include: participants, index test, target condition and reference standard. Conducting a comprehensive, objective and reproducible search for studies to determine the diagnostic accuracy of tests is a vital and challenging task in preparing a systematic review or a meta-analysis of DTA.

The findings of a systematic review or meta-analysis of diagnostic studies depend critically on decisions relating to which studies are included, and on decisions relating to which data from these studies are presented and analysed. Methods used for these decisions must be transparent, and they should be chosen to minimize biases and human error. Assessment of eligibility of studies, and extraction of data from study reports, should be done by at least two reviewers, independently. All relevant data should be extracted from the included studies. Detailed information regarding the study population, methods of the diagnostic test, reference standard, outcome variables should be extracted.

The assessment of methodological quality of studies included in a systematic review or meta-analyses of diagnostic studies is a necessary step to guide the analysis and interpretation of the results.

DTA may be evaluated across a number of studies; to improve the precision of the estimate, it may be desirable to combine data from a number of studies in a meta-analysis. Meta-analysis is a statistical method for pooling data across different studies and giving pooled diagnostic indices. For this purpose, a weight is attributed to each study and the weighted diagnostic indices are pooled together. Statistical software is available for this purpose.

Numerous sources of bias can affect the summary estimate of diagnostic test accuracy. When conducting a meta-analysis, potential sources of bias should be identified and investigated in terms of how they influence the summary estimates of DTA.

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA-DTA) checklist provides a minimum requirement for reporting systematic reviews and meta-analyses of DTA.

Key Words

Meta-analysis; Systematic review; diagnostic test accuracy; evidence-based medicine