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Evaluations of tumor treatment response by cancer imaging: A bibliometric survey

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Introduction
Imaging plays an increasing critical role in the assessment of tumor burden and evaluation of treatment response to various therapies. It is therefore not surprising that there has been a relentless increase in the demand for cancer imaging during recent years. Then the key policy and efficacy questions are “when, how often and in what sequence should the cancer imaging be done and which cancers are most feasible for the treatment effectiveness to be addressed in the timely manner by which imaging modality/protocol?”

Objective
In patients with advanced disease or those that require a neoadjuvant approach, there should be ongoing follow-up reassessments and prognostic evaluations. The escalating complexity of management brought with it a recognition that it has become necessary to establish an effective working collaboration between specialists through a high-quality, efficient and uniform cancer imaging service across HA and for that thereby stimulated the need to introduce an up-to-date HA cancer imaging guidance. The HA protocols would streamline radiological services in which appropriate scans are undertaken according to the patient’s tumor type and purpose of the examination. These protocols will also ensure that imaging studies can be performed more accurately during follow-up in an individual patient, irrespective of where the patient has been imaged. A survey of the cancer imaging bibliography on the evaluations of tumor treatment response is conducted to have an overview of best practices before we might have focus on how the HA imaging protocols could be introduced and to have insights on the policy and efficacy questions to meet the demands.

Result & Outcome
The search returned 2,472 and only 152 are used by filter of NCT clinical trial. The top four cancer keyword frequencies in the RECSIT bibliography are liver cell carcinoma (1,445), breast (1,080), lung non small cell (391) and colorectal (277). Two maps of co-word clusters are generated from co-occurrence keywords with liver cell carcinoma (Fig 1) and breast cancer (Fig 2). With these maps, an investigator can compare and contrast whether a given set of keywords contains any interesting structural patterns in both small clusters and macro-clusters related to the policy and efficacy questions such as which features might indicate the use of CT and / or MRI in hepatocellular carcinoma. These features are revealed simply by bibliographic visualization.

However, emerging novel therapeutic armamentarium as alternative options to patients with refractory or resistant tumors are cytokines rather than cytotoxic and objective demonstration of lack of response may be difficult by RECSIT criteria as tumor viability does not always correlate with tumor size change. Although FDG-PET imaging has been suggested as a sensitive and relatively more specific means to reflect tumor biologic changes and glucose metabolism after therapy, standard PET response criteria are still under development, and access to PET imaging is not yet universal. As such, functional quantitative imaging methods are needed currently to adapt or improve upon RECSIT for the criteria to be adopted.

Methodology
Cancer imaging document changes in tumor size using criteria agreed between the radiologist and oncologist, the Response Evaluation Criteria in Solid Tumors (RECIST), updated the World Health Organization (WHO) criteria. Keywords that frequently appeared are identified and co-word analysis is formulated from the abstracts retrieved from EMBASE via OvidSP with molf word search of “RECIST” in all fields.

Annotated Bibliography
- De Bello, N., Nappo and Paradigms: Bibliographic Citations at the Service of the History and Sociology of Science. In Bibliometrics and Citation Analysis: From the Science Citation Index to JCR, pp. 341-379. Leiden: AID-Springer Press, Inc. 2008
- The most commonly used units of bibliometric analysis for the underlining of conceptual structures within knowledge domains that are represented collectively by articles of designated scientific and technological area may be visualized with knowledge profiling systems.
- Co-word analysis with proximity measures called ‘influence’ from frequencies of co-occurrence of pairs of keywords may be employed to identify local and global mapping between ‘idea’ which is a knowledge domain in order to discover the dynamics of science and technology.
- The evolution of domain mapping techniques over the past decades may be followed through many significant developments in software for global portraiture of knowledge domains by the graphical rendering of bibliometric data.
- The abstracts from bibliographic database search are downloaded for processing and analysis using Bibexcel which is an excel data file from any fields in the bibliographic record and perform a wide variety of bibliometric analysis to generate the required indices that can be imported to Microsoft Excel.
- The book together with the software package RECSIT and stasticOMC offers an entry software environments for the(inter) pre-treatment analysis in those beginning with it for speedy and cost-free statistical computing and graphics creation that follows a familiar model (though Excel to generate the final input output).
- Graham: C.L., McCullough R., M. Mull, S. Partinger P. F. Wallis, Using a bibliometric analysis of the literature in order to understand the distribution of two pharmacological agents to mimic peritoneal blood flow. 21st International Meeting of the International Society of Technology Assessment in Health Care, Barcelona (Spain). 2008, 20-29 August.
- Sample applications of bibliometric analysis in various health care domains.

Fig. 1. Multidimensional mapping of co-word clusters from occurrence nouns of the top 30 highly frequent keywords with high occurrence frequencies, the subset of which is 500 clusters (Jan. 2010) (dark color of the keyword proportional to the co-word frequency with times color)