Analysis of subsequent publication of scientific orally presented abstracts of the French national congress of radiology. Part I: General characteristics

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Abstract

Purpose: To evaluate the publication rate of scientific abstracts orally presented at the annual meeting of the French Society of Radiology (FSR), and to identify factors associated with publication.

Material and methods: Abstracts were selected from the books of abstracts of the 2008–2010 annual meetings of the FSR. For each abstract, country of origin, diagnostic/interventional radiology, imaging techniques (plain radiography, angiography, ultrasound [US], computed tomography [CT], magnetic resonance imaging [MRI]), human/experimental study, retrospective/prospective design, number of subjects, oncologic study or not were noted. Publications were searched in Medline-indexed journals and factors associated analyzed by multivariate analysis.

Results: Seven hundred and forty-four abstracts lead to 298 publications (publication rate 40%). Most abstracts reported retrospective studies (61%), in humans (94%), diagnostic imaging (85%), from European authors (90%), and oncology (27%). Median number of subject was 39 (19–87). Main imaging techniques were MRI, CT, US (46%, 29%, 21%). Publications were mostly in English
(89%), in radiological journals (72%), with a mean 3.5 ± 3.7 impact factor. Publication was associated with a prospective design (OR = 1.80), a submission from Europe (OR = 1.71), angiography (OR = 2.44), and oncology (OR = 1.81).

Conclusion: The annual meeting of the FSR is in French, but the rate of publication of presented abstracts is high, mostly in English in reputable journals.

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Abbreviations

CT      computed tomography  
FSR     French Society of Radiology  
MRI     magnetic resonance imaging  
US      ultrasound

Introduction

Publication is of paramount importance in clinical and experimental research, and constitutes the main medium for sharing scientific and medical knowledge. Indeed, the publication of the results of research is an essential part of the scientific method, by exposing them to objective and independent verification made by peer review. Aside from that, it is also considered as one of the main evaluation and comparison techniques of universities and research teams.

Over the past decades, the role of diagnostic and interventional imaging has drastically changed in patients’ management. This has translated into a marked increase in the number and quality of related publications. Indeed, a research of the terms ‘medical imaging’ in Medline-indexed journals shows a doubling in the number of published papers from 2000 to 2012, from 43,551 up to 86,602 (+98%). Despite this increase, impact factors, frequently used as a proxy for evaluating the rank of scientific journals, has shown a significant increase in radiological journals: Radiology, 4.130 to 6.339, (+53%), European Radiology, 1.119 to 3.548 (+217%), and AJR 1.863 to 2.897 (+56%).

Scientific meetings and congresses are another major moment of the scientific life, by allowing peer-to-peer vivid discussion, and presentation of recent works. Aside from the reputation and prestige, rating of meetings is difficult, and, to date, no equivalent to the publication impact factor exists. Hence, some authors suggested that the rate of publication of orally presented scientific abstracts might constitute an interesting criterion [1]. Regarding radiology meetings, several investigations reported publication rates ranging from 8% to 47% [2–12].

The annual meeting of the French Society of Radiology is the main French-speaking radiology meeting in the world, with close to 18,000 participants (50% radiologists, 31% exhibitors, 19% other professions) and radiologists come from 72 different countries [13]. Regarding the 1996 meeting, Arrivé et al. have reported a publication rate of 8.5% [8], significantly lower than that of other publications rates in the field of medical imaging [2–5]. Moreover, factors associated with subsequent publication have not been properly analysed.

Therefore, the aim of our study was to evaluate the publication rate of the scientific abstracts orally presented at the 2008, 2009, and 2010 annual meetings of the French Society of Radiology, and to identify predictive factors of publication.

Material and methods

Identification of scientific abstracts

Identification of abstracts was performed by one junior radiologist (VDR), by examining the online abstract books of the 2008, 2009, and 2010 annual meetings of the French Society of Radiology, and isolating all orally presented original research studies, excluding continuing medical education courses and posters. To avoid any mistake, a cross-verification was performed by reviewing the paper published books of abstracts of the same 3 years.

Abstract characteristics

All selected abstracts were analysed by one junior and one senior radiologist (VDR and MR). For each individual abstract, the following items were recorded:

• radiological subspecialty (e.g. neuroradiology, gastrointestinal imaging, etc.);
• country of origin;
• diagnostic or interventional radiology;
• the main modality of imaging (i.e. plain radiography, angiography, ultrasound [US], computed tomography [CT], magnetic resonance imaging [MRI], and nuclear medicine);
• human or experimental study;
• retrospective or prospective design;
• number of included subjects;
• onologic study or not.

When the information regarding the study design was not available, study was considered to be retrospective.

Study search and data collection

Publication in Medline-indexed journals was identified by scanning the PubMed database over the period from October 2008 to October 2013. Identification of publications
was performed using the last name and the initial letter of the first name of the first author of the abstract. If the search did not yield any result, the process was repeated using the second, and last authors of the abstract. If the result included more than 20 publications with an author, an additional criterion was used as another author or keywords from the title of the abstract that might simplify the search.

Only original articles corresponding to the abstracts were selected. Letters, reviews, and editorialials were excluded. To avoid mistakes based on similar titles, the concordance between the two abstracts (oral presentation and article) was checked. We selected all articles with high concordance as well as:

- those which addressed a more restricted subject matter than the corresponding abstract (as truncation might have occurred during the review process);
- articles in which the numbers of subjects was higher than in the oral presentation, if oral presentation was a preliminary report of the same protocol.

For each published article, the following data was recorded:
- name of the journal;
- impact factor of the journal according to the Thompson Reuters Journal Citation Report® on the date of publication (http://wokinfo.com/products_tools/analytical/jcr/);
- the language of the publication (English or French);
- the main topic of the journal, i.e. clinical or medical imaging journal;
- the number of citations of the article according to Google Scholar (http://scholar.google.com/).

Statistical analyses
Values were expressed as a mean and standard deviation, or median and interquartile range, and percentage, as appropriate. Publication rate was defined as the ratio between the number of subsequently published articles in Medline-indexed journals, and the total number of orally presented scientific abstracts. Non-parametric Wilcoxon rank-sum test was used to compare quantitative variables, and Chi² or Fisher exact test for categorical variables. Abstracts that lead to publication were compared to those who did not. All factors associated with publication on univariate analysis were used in a binary logistic regression model. Given that several imaging techniques may be associated in one abstract or publication, different imaging techniques were considered as independent factors. A P-value of 0.05 was considered to be significant. The analyses were performed with the Statistical Package for the Social Sciences (SPSS) software (version 20.0, SPSS Inc., Chicago, IL).

Results
Abstracts characteristics
During the study period, a total of 744 abstracts were identified (2008 = 255, 34%; 2009 = 237, 32%, and 2010 = 252, 34%, P > 0.05). Table 1 summarizes the abstracts characteristics. Briefly, there were mostly retrospective studies (n = 460, 61%), in human subjects (n = 699, 94%), focusing on diagnostic imaging (n = 636, 85%). The median number of included subjects was 39 (19–87).

The most frequent imaging modalities were MRI (n = 340, 46%), followed by CT (n = 215, 29%), and ultrasound (n = 155, 21%). Twenty-seven percent of the abstracts (n = 203) reported oncologic studies. The most frequent radiologic subspecialties were abdominal and digestive (n = 128, 17%), musculoskeletal (n = 103, 14%), cardiovascular (n = 96, 13%), and genitourinary imaging (n = 91, 12%).

The vast majority of abstracts were issued from French authors (n = 624, 84%), followed by African (n = 53, 7%), and European authors (n = 47, 6%).

Published articles
Between October 2008 and November 2013, 298 of the 744 scientific abstract orally presented at the French meeting in 2008–2010 were expanded into articles published in Medline-indexed journals, leading to a publication rate of 40%. The publication rate of the 2008, 2009, and 2010 meetings were 43.5% (111/255), 37.5% (89/237), and 38.8% (98/252) (P = 0.36).

The mean delay between presentation and publication was 21 months ± 13.7 (median 18 months, IQR 10–29). The majority of articles were published in English-language journals (n = 266, 89%). The mean impact factor of the journals at the date of publication was 3.5 ± 3.7 (median 2.9, IQR 1.7–4.1, range 0.35–51.66). Most articles were published in radiological journals (n = 215, 72%). The mean number of citations per article during the study period was 16.7 ± 30 (median 7, IQR 2–19).

A total of 137 articles (46%) were published in eight journals, in decreasing order: European Radiology (n = 39, 13%), Radiology (n = 27, 9%), Diagnostic and Interventional Imaging and his previous denomination Journal de Radiologie (n = 26, 8.7%), Journal of Magnetic Resonance Imaging (n = 11, 3.7%), American Journal of Roentgenology (n = 10, 3.4%), Cardiovascular and Interventional Radiology (n = 9, 3%), Journal of Neuroradiology (n = 9, 3%), and American Journal of Neuroradiology (n = 6, 2%). The other 161 articles were published in 111 journals, with fewer than six articles published in each. Regarding the clinical journals, with three articles each, Hepatology and European Journal of Gastroenterology and Hepatology were the most represented.

Factors associated with publication
Factors associated with publication are presented in Table 1. On univariate analysis, publication was positively associated with a prospective study design (P < 0.001), interventional imaging (P = 0.015), angiography (P = 0.002), experimental studies (P = 0.007), European authors (P < 0.0001), oncologic topic (P = 0.004), and the organ subspecialty (P = 0.004). On the opposite, the CT-based or plain radiography-based studies negatively affected the publication rate (P = 0.013, and P < 0.0001, respectively).

There was no association between the number of included patients and the publication rate (P = 0.404). Regarding the imaging subspecialties, the highest rate of publication concerned thoracic imaging (56%), followed by abdominal and digestive imaging (53%), genitourinary imaging (45%), and neuroradiology (43%).

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On multivariate analysis, publication was positively associated with a prospective study design (OR = 1.80, CI 95% [1.29–2.52], P = 0.0001), European authors (OR = 1.71, CI 95% [1.06–2.77], P = 0.028), angiography-based studies (OR = 2.44, CI 95% [1.34–4.47], P = 0.004), and oncologic topic (OR = 1.81, CI 95% [1.27–2.58], P = 0.001). Plain radiography, and study on humans were negatively associated with publication (OR = 0.37, CI 95% [0.21–0.68], P = 0.001; and OR = 0.44, CI 95% [0.19–0.99], P = 0.047).

**Discussion**

As the rate of publication of orally presented scientific abstracts constitutes an interesting criterion to evaluate the scientific value of a medical congress, we aimed to look at it for the annual meeting of the French Society of Radiology. We report here a mean 40% of publication over a three consecutive year period which is significantly higher than that previously reported by Arrivé et al. in
1996 for the same meeting (8.5%, P < 0.0001) [8]. This might be partially explained by a higher abstract selection resulting in a decrease of the number of abstracts orally presented in recent years with a mean of 248 each year for our study period and 456 for 1996 [8]. Nevertheless, and more importantly, it certainly represents an evolution of French academic radiologists towards more publications. Many other factors may influence these changes, including the presence of more academic teams, the diffusion of evaluation scores based on publications, or the development of structured research networks. Further analyses should be performed using social sciences methodology.

Interestingly, the publication ratio reported here is higher than that of other national radiological societies (15% in Turkey from 1995 to 2002 [6], 29% in Australia and New Zealand from 1996 to 1999 [14]), and similar to that of other international radiological meetings: 33% for the annual meeting of the Radiological Society of North America (RSNA) in 1995 [7], 47% and 45% for the European Congress of Radiology (ECR) in 2000 and 2001 [3,4], and 39.5% for the annual meeting of the European Society of Gastrointestinal and Abdominal Radiology (ESGAR) in 2000–2001 [6]. This publication rate is also comparable to other medical or surgical meetings. For instance, Winnik et al. reported a publication rate of 38% for the European Society of Cardiology Congress in 2006 [15], while Smith et al. published 38% for the annual meeting of the American Urological Association in 2000 [16].

In our study, most articles were published in radiological journals, but 28% were published in non-radiological journals. This percentage is higher than the 21.5% reported by Miguel-Dasit et al. regarding ECR [3], and comparable to the 25.4% reported by Yun et al. who looked at articles published by radiologists in non-radiological journals worldwide in 2000 [17]. However, these authors also observed an increase of this percentage along the years: 2000, with up to 35.7% published in non-radiological journals in 2010 [17]. Despite being a French-speaking meeting, 89% of the publications were issued in English-language journals, European Radiology and Radiology representing 22% of the journals. This is another difference with the previous studies where most publications were found in the official Journal of the meeting Society [3,4,7]. This could be explained by the higher impact factor of these journals compared to the French one. Since 2012, the French Society of Radiology has decided to publish its official journal on line in English (Diagnostic and Interventional Imaging, formerly Journal de Radiologie). This will probably increase the number of articles published in English by French radiologists over the next years.

The main factors associated with publication were the prospective study design, experimental works, angiography-based studies, and oncologic topic. Some of these could be interpreted as a sign of more intense scientific commitment. Indeed, a prospective design generally indicates a clear effort towards more thorough studies, and has been already reported [10,11,15,16]. Moreover, experimental research is often performed by academic trainees working in active research teams. Therefore, it may encourage them to subsequently publish their results [11]. However, others have reported opposite results [2,7,10].

Most presentations reported diagnostic studies, but the subgroup dealing with interventional radiology leads to a higher rate of publications. Miguel-Dasit et al. also reported the highest rate of publication for interventional radiology studies presented at the ECR in 2001 [3]. It may also be partially explained by the fact that interventional radiology studies often report oncologic series. Indeed, oncology was associated with publication and this is in line with other reports. Yun et al. stated that when considering the subject categories of publications from radiologists, oncology, together with surgery, and neurosciences accounted for the highest proportion of publications [17].

The highest rate of publication concerned thoracic imaging (56%), followed by abdominal and digestive imaging (53%), genitourinary imaging (45%), and neuroradiology (43%). Regarding thoracic imaging, this is partially explained by the presence of several well-known French team leaders working in this field. This is also in line with results from Miguel-Dasit et al. regarding ECR, as authors reported 56% of publication rates for chest and cardiac studies [4]. However, an overview of the different publications shows variable ranking of imaging subspecialities, preventing from drawing any global conclusion or even trend [2–12].

Our study suffers from several limitations. First the number of publications does not represent the total number of publications issued from the different teams over the study period. Indeed, publications that were not presented at the meeting were not included. Therefore, potential underestimation and associated bias have to be taken into consideration when identifying factors associated with publication. Second, we did not analyse the fate of abstracts presented as posters, or that of those submitted to the scientific committee but rejected for presentation. Indeed, others have reported that it is significantly lower than that of orally presented abstracts, but not null [18]. Third, due to the study period, we analysed only publications issues 3 to 5 years after the meetings. Therefore, more recent publications might have been missed leading to an underestimation bias. Yet, we selected this time frame because some authors reported mean publications delays ranging from 14 to 24 months, and Arrivé et al. published that 94% of the articles were published within the 3 years following a meeting [2–12]. Therefore, we believe that this potential bias is limited. Finally, our identification process for publication was limited to Medline-indexed journal but previous researchers have shown that Medline search for articles on medical imaging was nearly exhaustive [19].

Conclusion

In conclusion, the rate of publication of abstract orally presented at the annual meeting of the French Society of Radiology is similar to that of other international radiological meetings and is a strong encouragement to expand abstracts into full-text articles.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.
References