Clinical Imaging 54 (2019) 121–125

Contents lists available at ScienceDirect

Clinical Imaging

journal homepage: www.elsevier.com/locate/clinimag

Breast Imaging

How to survive and thrive as a new breast imager: what they don't teach in fellowship

Toma S. Omofoye, Jay R. Parikh*

Department of Radiology, MD Anderson Cancer Center, 1515 Holcombe Blvd., CPB 5.3208, Houston, TX 77030, USA

ARTICLE INFO

Keywords:
Breast imager
Transition
Career
Workload
Breast imaging

ABSTRACT

Purpose: To provide practical tips to assist new breast imagers succeed in their first job after fellowship training.
Methods: Transitioning from fellowship to a practicing breast radiologist is daunting for the new radiologist. There is a void in the literature addressing this transition. Practical tips are described based on various roles a new breast radiologist must navigate and highlights skills that can help ensure a successful transition and career.
Results: Proficiency in clinical acumen may be assisted by becoming familiar with sentinel works and feedback based on the medical outcome audit. Noninterpretive skills that can assist the transition include communication skills, delegation of tasks, and implementing hanging protocols. Depending on the practice, skills in research, education, administration, teamwork, and community engagement may also assist the successful transition.
Conclusion: Practical strategies can assist the new breast radiologist to become proficient at essential skills that will assist the radiologist to survive and thrive in clinical practice.

1. Introduction

For residents and fellows, the period of radiology training can be a cocoon within which the focus is on surviving individual rotations, passing in-service examinations, enduring call shifts, and trying to maintain dignity when called upon to discuss cases in conferences. Eventually, training is completed, and trainees transition to independent practice in breast imaging at academic centers, private practices, or hybrid practices. That transition can be overwhelming as there are unique challenges to newfound independence which are not addressed in published literature [1,2].

The Society of Breast Imaging (SBI)/American College of Radiology (ACR) breast imaging training curriculum describes in great detail the technical and academic information that will lead to proficiency; and encourages teaching of proper physician- patient communication, however, there is no information regarding less concrete (but no less important) skills that can lead to successful careers [3]. Furthermore, a survey of breast imaging fellowship directors across North America revealed that despite recommendations of the SBI/ACR curriculum, training often excludes significant non-clinical areas such as quality control, practice audits, and technical aspects of mammography [4].

This article describes several essential skills which can help a new breast imager survive and thrive in practice. These include clinical acumen, non-interpretive skills, research, teaching, administration, teamwork and community involvement. This article suggests practical strategies for the new breast imager to become more proficient in these areas.

1.1. Clinical Skills

Although the majority of trainees learn the clinical skills recommended by the SBI/ACR endorsed breast imaging curriculum, the weight of responsibility as the final reader in a new practice setting can cause anxiety and an unsustainably slowed pace [2]. For new radiologists, early confidence comes from practicing within the tenets of the specialty. Therefore, if not previously emphasized during training, the radiologist should become familiar with American College of Radiology (ACR) Appropriateness Criteria [5], ACR Practice Parameters [6], the latest edition of the ACR Breast Imaging Reporting and Data System (BI-RADS) [7], articles which demonstrate the reduction in mortality from breast cancer [8], downstaging of disease from screening mammography [9,10], and benefits of tomosynthesis [11], as well as other seminal works in the field. If questions arise regarding the newly practicing breast radiologist's clinical competence and decision-making, demonstration that such management is in agreement with the principles outlined in these sources, which are based on rigorous scientific

Abbreviations: SBI, Society of Breast Imaging; ACR, American College of Radiology

* Corresponding author.
E-mail address: JRParikh@MDAnderson.org (J.R. Parikh).

https://doi.org/10.1016/j.clinimag.2018.12.010
Received 23 September 2018; Received in revised form 3 November 2018; Accepted 27 December 2018

review and consensus, will place the clinical decisions beyond reproach.

Medical audits represent a potential extra source of anxiety for new breast imagers as they represent an objective, recurring review of clinical skills. The current (fifth) edition of the BI-RADS Atlas [7] documents a summary of established parameters for clinical performance of breast imagers, including parameters for screening recall rate, biopsy rate, and cancer detection rate [12].

The screening recall rate is the most easily monitored and improved, as radiologists can keep an ongoing weekly tally of their recall rate either manually or by utilizing software available from their facility. New breast radiologists should be aware that recent articles challenge traditional concepts of lower recall rates being ideal outcomes and recall rates necessarily going down with experience [13,14]. Where possible, personally performing the diagnostic evaluations for their recalled patients may help the radiologist detect patterns of "overcalls" to which they are prone. If a new breast radiologist is a persistent and consistent outlier compared to other radiologists in the group, interpreting mammograms with the assistance of a senior double reader [15] may help improve reduce false positive recalls. Additionally, the new breast imager can attend established breast imaging courses to help reduce recall rates.

Similarly, monitoring the rate at which biopsy is recommended after diagnostic work-up will increase positive predictive value and further hone clinical skills. If it is impossible for a radiologist to personally evaluate all their recalled patients, there is educational benefit in taking time after work hours to learn the eventual diagnostic evaluation and management of those cases. This practice can be kept up until the recall rate approaches the recommended 10% [7,12].

During the initial months of practice, a breast radiologist may not be able to meet all performance targets [16]. However, research has shown that audit results presented one-on-one by senior faculty combined with educational meetings can result in improved performance [16,17].

In the course of practice, new mammographers will encounter some cases for which management is unclear. In such cases, it is often tempting to categorize the finding as "probably benign." However, the definition and characteristics of true probably benign findings are well established and data driven [7,18]. When proper management is unclear, the more appropriate response is to confer with senior colleagues about group protocols, research the published literature, and/or discuss the finding with referring clinicians when multidisciplinary input could provide additional benefit.

One advantage that recent fellowship graduates have is exposure during training to modern imaging technology, such as digital breast tomosynthesis and breast-specific gamma imaging. Radiologists in practice may have participated in continuing medical education (CME) courses to fulfill an 8 hourh requirement for these new modalities [19], which often represents less exposure than that received during a formal fellowship. The new hire may be therefore be expected to be the "expert" on these cases in the group, so it is important to absorb the information when it is available during fellowship.

1.2. Non-interpretive skills

Some radiologists struggle with patient communication, especially when bad news must be shared. In one study, up to 85% of breast imagers denied receiving any training on delivering bad news [20]. Several articles have touched on this subject and provide data indicating that good doctor-patient communication has many benefits, including greater patient satisfaction, treatment adherence, and physician work satisfaction [21,22]. The physician's focus should be on discerning the patient's problems, adapting information to address them, evaluating patient understanding by obtaining feedback, patiently discussing treatment options, and reaching a consensus [22]. Breast imagers have face time with patients [23] and have the advantage of being able to offer the patient an actionable report or treatment plan (1-year screening, short-term follow-up, additional imaging, biopsy, or consultation with surgeon or other clinician), which can provide a sense of comfort and control to the patient [24]. Thus, no matter the news shared, patients can be reassured that their concerns will be addressed.

Since efficiency and time management are important in practice, delegation of certain tasks to other qualified team members should occur whenever appropriate [25]. The breast center manager or lead technologist may be able to address protocol questions from receptionists and new technologists, particularly when standardized protocols have been established [26]. Reading room coordinators can be employed to get other physicians on the phone for the radiologists, reducing the time spent by the radiologist dealing with phone chains, incorrect numbers, and unavailable providers [27]. Radiology assistants may be able to address post biopsy care with a patient or communicate benign biopsy results [25]. The ability to delegate improves overall efficiency and minimizes interruptions in radiologist workflow.

Making a concerted effort to become proficient at the imaging viewing software and dictation system used by the practice can greatly increase efficiency. Wherever possible, a radiologist should create shortcuts and hanging protocols which can dramatically increase efficiency to meet expectations of the organization [28].

If necessary, new breast imagers may need to spend additional time before or after "standard" work hours to finish up their clinical work. While working outside of standard hours is inconvenient, it will demonstrate a willingness to contribute fairly to the team. Over time, as confidence builds and process efficiency increases, the amount of work expected can be accomplished within the standard time frame; routinely staying late is not viable long term [1].

Since the burnout rate for diagnostic radiologists is high [29,30] and burnout often increases with transitions, it is important to consciously develop strategies to practice self-care [31]. Reducing prolonged periods of stress, building efficiency, avoiding isolation, maintaining work-life balance, and seeking professional help are all means within the radiologists' control to maintain a healthy mind at work [31].

1.3. Research and experimental innovations

For academic careers that include research obligations, creating a research niche, developing a research project, and obtaining funding can be daunting for the newly practicing breast imager. Institutional support, protected research time, and training in research methods have been identified as being critical to having a successful career [32]. One notable challenge for new academic radiologists is deciding what research niche to pursue; the radiologist should consider the following:

- Ongoing work in the department for which additional hands and ideas are needed [33].
- Gaps in the literature related to imaging management encountered in daily clinical practice or triggered by one's experience [34].
- Possibilities to create offshoots of projects done by a mentor [34].
- Funding sources available at the institution that may be tied to specific research areas of interest [34].
- The patient population in the community with their particular characteristics
- Readily available technology in the department that is new or may be applied in a novel manner.

For the new breast imager, exploration of medical innovation and technology can provide great opportunity for developing expertise and establishing one's value to their practice. For example, there is ongoing research on the utility of Positron Emission Tomography (PET) in breast cancer with many offshoots (including CT and MRI applications) for the curious scientist [35]. There are also increasing opportunities to explore Positron Emission Mammography (PEM), where standard

mammographic staging is utilized and improved target-detector positioning improves detection of breast lesions [36]. Similarly, contrast-enhanced digital mammography and its detection of angiogenesis in breast carcinoma is increasingly being adopted in the clinical arena, and represents a good option for clinical research [37]. Another innovation that takes advantage of oncologic angiogenesis is photoacoustic imaging based on hemoglobin absorption in the near infrared [38].

Research training and funding opportunities are often available through professional associations and the National Institutes of Health (NIH), which offers physician-researcher training programs and grants. Selection of new radiologists for these programs may depend on nominations and demonstrating value; therefore, it is important to communicate early career goals with leaders in their department.

A robust relationship with a mentor is important [39]. Good candidates for mentors could be the section chief or prolific researchers in the same department, or may be outside the department [40]. A mentor may be aware of opportunities for professional development and ongoing research projects that match the particular interests of a new hire [39]. Also, when inevitable research setbacks arise, a mentor can be an invaluable resource on next steps [40]. Importantly, a good mentor-mentee relationship will lead to discussion of career advancement and promotion [39].

1.4. Education

As a new attending academic breast radiologist, there is often an expectation to participate in formal trainee education. Research suggests that resident-led teaching during training increases competence and teaching as a new practitioner [41]. Furthermore, teaching provides the opportunity to impact future generations of radiologists [42].

With the new American Board of Radiology (ABR) examination schedule, newly practicing breast radiologists may be preparing for the ABR certifying examination while they transition to their new job. This situation presents a potential teaching advantage as the same system of organization required to prepare for the boards can be applied to create lecture outlines. The simple memory aids used by the new breast radiologist may be invaluable to trainees grappling with complex topics.

Attending educational presentations by more experienced radiologists in the department may be beneficial. By observing different styles of speaking, lecture material organization, audience interaction, and radiological image presentations, junior faculty can refine their personal style. Having one's presentations videotaped and critiqued can also be a valuable means to improve presentation skills.

1.5. Administration

A new breast imager may be asked to serve as lead interpreting physician for Mammography Quality Standards Act (MQSA) accreditation [43]. This role comes with significant responsibilities, including supervising technologist positioning, regularly reviewing Quality Control (QC) books, and reviewing medical audits with interpreting physicians. Working with experienced lead interpreting physicians in the practice, reading references related to the QC process, and even attending relevant CME courses can assist the transition to that role.

New breast radiologists may choose to or be asked to serve on committees. Service on hospital-based committees, such as the cancer committee, resource utilization committee, or credentialing committee, is a quick way for the new breast imager to become known by hospital leaders [44]. Service on clinically oriented breast committees, such as those related to imaging protocols, radiology/pathology review, and emerging technologies, is sometimes an option. The new hire may bring to these committees a valuable updated perspective regarding different practice protocols and quality assurance measures employed at previous training institutions. The new breast radiologist can help implement positive change and demonstrate value to their fellow radiologists, practice, and the hospital [44].

A more ambitious new breast radiologist may also have the opportunity to serve on regional and national committees related to breast imaging. For example, in state medical and radiological societies, breast imagers may become involved in the program committees for organizing educational conferences. Within national organizations such as the American College of Radiology, there are opportunities to volunteer in multiple different types of breast –related committees, including economics, guidelines development, and quality and accreditation [45].

1.6. Teamwork

In the current medical climate, the work of breast imagers is closely intertwined with that of clinicians from other disciplines, referring clinicians, and staff. Indeed, a survey of department chairs in academic radiology revealed that next to subspecialty expertise and fellowship training, the ability to work well with referrers was the next most desirable skill in new hires [46].

New breast imagers should not hesitate to initiate contact with a specific referring physician about a challenging case when further clinical correlation may be helpful in rendering a diagnostic or management recommendation, reaching out to physician communities (particularly primary care physicians and obstetricians/gynecologists) as needed relevant data or best practices are released, and developing relationships with the pathologist and surgical/oncologic specialists at respective institutions through either formal or informal channels. Similarly, a good relationship with referring clinicians is invaluable when a patient has a complication such as a displaced clip, need for additional imaging tests, or unusual outcome that may be ascribed to the radiologist. New breast imagers should be open to receiving phone calls from referring physicians, reviewing images with the treatment team, and accommodating add-on patients. Such behavior indicates good teamwork and patient-centered care, may result in increased referrals, and research or educational collaborations; all of which result in increased visibility of radiologists- which has been emphasized as a necessary role by leaders in radiology [47,48].

Interactions with technologists and support staff need to be assertive but respectful. Breast imagers should keep in mind that support staff are often privy to how a new imager's practice style deviates from that of the group. It is important that breast imagers remain approachable such that support staff feel comfortable indicating any concerns about patient care, as patient safety and quality of care improve with good relationships between radiologists and support staff [49].

Participating in multidisciplinary case discussions should be welcomed and demonstrates value to colleagues in other departments [50]. The material from these discussions may serve as a quality improvement project for ABR Maintenance of Certification [51,52]. Exposure to interesting and unusual cases, including those that may have been managed at other institutions, can help sharpen the clinical skills of the new breast imager.

1.7. Community involvement

With data indicating that patients, radiologists and hospital administration all desire patient awareness of the role of radiologists in healthcare, radiologists indicate that they are often constrained from communicating directly with patients due to workload [53]. Leaders in the field of radiology have recommended that radiologists become more visible as a way to demonstrate value to hospital administration [47,48]. Given the limited time for one on one patient interaction, and importance of raising awareness of the role of radiologists, new breast imagers should embrace opportunities to participate in community outreach events for the group or institution. These may be educational events for the public, educational events for charitable organizations, and fundraisers.

Radiologists who are reluctant public speakers can apply creativity to this role. For example, instead of lecturing to an auditorium of people, a radiologist might choose to organize an informal gathering and share prepared pamphlets. Alternatively, a radiologist might want to organize social events where, between periods of socializing, some pearls about the role of breast imaging can be shared with the community.

Another powerful and effective way to connect to the community is social media [54,55]. Uses of social media include educating patients, marketing the group, and connecting with the community [54,56]. Some patients indicate interest in having their physicians use social media to help them manage their health [54]. A new breast imager can consider creating an online identity through which the group can interface with patients and raise its profile in the community [56]. Examples of patient education through social media include raising awareness of early detection through Twitter during breast cancer awareness month [57] and YouTube videos for understanding imaging examinations like mammography [58]. Research indicates that while radiology-specific social media content may increase connection to patients, few academic radiology groups have a radiology presence in social media [55]. As other members of the group may not be social media savvy, or have multiple responsibilities leaving little time for online networking, a new hire might take up this role. The opportunity to address the community, serve the radiology group and potentially help the hospital refine medicolegal guidelines for social media use, could ultimately lead to niche career expertise and personal fulfillment.

2. Conclusions

The transition from trainee to attending breast imager can be daunting. Thriving as a new breast imager requires great clinical acumen but also attention to non-interpretive, administrative, research, and educational skills. In order to thrive, breast imagers making the transition to independence must be adaptable and approach their new roles and responsibilities with enthusiasm. New employees have unique opportunities to demonstrate value by engaging in meaningful networking with referring clinicians, engaging in community involvement, and utilizing social media for networking. Eventually, breast imagers transitioning to independent practice gain expertise with experience, which brings with it increasing personal job satisfaction.

Disclosures

None relevant to the article.

References

[1] Cronan JJ. My first job: the transition from residency to employment–what the employer and employee should know. J Am Coll Radiol 2008;5:193–6.
[2] Yablon CM, Kapustin AJ, Eisenberg RL. Private practice: what is expected of the new graduate? AJR Am J Roentgenol 2011;197:W21–2.
[3] Monticciolo DL, Rebner M, Appleton CM, et al. The acr/society of breast imaging resident and fellowship training curriculum for breast imaging, updated. J Am Coll Radiol 2013;10:207–210.e4.
[4] Farria DM, Salcman J, Monticciolo DL, Monsees BS, Rebner M, Bassett LW. A survey of breast imaging fellowship programs: current status of curriculum and training in the United States and Canada. J Am Coll Radiol 2014;11:894–8.
[5] American College of Radiology. Acr appropriateness criteria. https://www.acr.org/Quality-Safety/Appropriateness-Criteria; 2018, Accessed date: 16 September 2018.
[6] American College of Radiology. Practice parameters and technical standards. https://www.acr.org/Quality-Safety/Standards-Guidelines; 2018, Accessed date: 16 September 2018.
[7] American College of Radiology. Acr bi-rads atlas 5th edition. https://www.acr.org/Quality-Safety/Resources/BIRADS/About-BIRADS; 2013, Accessed date: 16 September 2018.
[8] Tabar L, Vitak B, Chen TH, et al. Swedish two-county trial: impact of mammographic screening on breast cancer mortality during 3 decades. Radiology 2011;260:658–63.
[9] Malmgren JA, Parikh J, Atwood MK, Kaplan HG. Impact of mammography detection on the course of breast cancer in women aged 40–49 years. Radiology 2012;262:797–806.
[10] Malmgren JA, Parikh J, Atwood MK, Kaplan HG. Improved prognosis of women aged 75 and older with mammography-detected breast cancer. Radiology 2014;273:686–94.
[11] Friedewald SM, Rafferty EA, Rose SL, et al. Breast cancer screening using tomosynthesis in combination with digital mammography. JAMA 2014;311:2499–507.
[12] American College of Radiology. Ii. The basic clinically relevant audit. https://www.acr.org/-/media/ACR/Files/RADS/BI-RADS/FUOM-Basic-Audit.pdf; 2013, Accessed date: 16 September 2018.
[13] Grabler P, Sighoko D, Wang L, Allgood K, Ansell D. Recall and cancer detection rates for screening mammography: finding the sweet spot. AJR Am J Roentgenol 2017;208:208–13.
[14] DiPrete O, Lourenco AP, Baird GL, Mainiero MB. Screening digital mammography recall rate: does it change with digital breast tomosynthesis experience? Radiology 2018;286:838–44.
[15] Pow RE, Mello-Thoms C, Brennan P. Evaluation of the effect of double reporting on test accuracy in screening and diagnostic imaging studies: a review of the evidence. J Med Imaging Radiat Oncol 2016;60:306–14.
[16] Perry N. Interpretive skills in the national health service breast screening programme: performance indicators and remedial measures. Semin Breast Dis 2003;6:108–13.
[17] Aiello Bowles EJ, Geller BM. Best ways to provide feedback to radiologists on mammography performance. AJR Am J Roentgenol 2009;193:157–64.
[18] Graf O, Helbich TH, Hopf G, Graf C, Sickles EA. Probably benign breast masses at us: is follow-up an acceptable alternative to biopsy? Radiology 2007;244:87–93.
[19] Food and Drug Administration. 21 cfr part 900 quality mammography standards subpart b—Quality standards and certification. http://www.acraccreditation.org/~/media/ACRAccreditation/Documents/Mammography/Forms/PersonnelRequirements.pdf?la=en; 2010, Accessed date: 16 September 2018.
[20] Adler DD, Riba MB, Eggly S. Breaking bad news in the breast imaging setting. Acad Radiol 2009;16:130–5.
[21] Levinson W, Lesser CS, Epstein RM. Developing physician communication skills for patient-centered care. Health Aff (Millwood) 2010;29:1310–8.
[22] Maguire P, Pitceathly C. Key communication skills and how to acquire them. BMJ 2002;325:697–700.
[23] Mayo 3rd RC, Parikh JR. Breast imaging: the face of imaging 3.0. J Am Coll Radiol 2016;13:1003–7.
[24] Harvey JA, Cohen MA, Brenin DR, Nicholson BT, Adams RB. Breaking bad news: a primer for radiologists in breast imaging. J Am Coll Radiol 2007;4:800–8.
[25] Ellenbogen PH, Hoffman TR, Short BW, Gonzalez A. The radiologist assistant: what radiologists need to know now. J Am Coll Radiol 2007;4:461–70.
[26] Kalambo M, Parikh JR. Implementing standardized protocols during geographic radiology expansion. J Am Coll Radiol 2017;14:84–6.
[27] Rosenkrantz AB, Kang SK, Rybak L, Alexa D, Recht MP. The reading room coordinator: reducing radiologist burnout in the digital age. J Am Coll Radiol 2018;15:65–8.
[28] Thrall JH. Reinventing radiology in the digital age. Part iii. Facilities, work processes, and job responsibilities. Radiology 2005;237:790–3.
[29] Peckham C. Medscape national physician burnout & depression report. https://www.medscape.com/slideshow/2018-lifestyle-burnout-depression-6009235; 2018, Accessed date: 3 June 2018.
[30] Kaplan DA. Stop burnout in radiology before it starts. http://www.diagnosticimaging.com/burnout/stop-burnout-radiology-it-starts; February 27 2018, Accessed date: 3 June 2018.
[31] Harolds JA, Parikh JR, Bluth EI, Dutton SC, Recht MP. Burnout of radiologists: frequency, risk factors, and remedies: a report of the acr commission on human resources. J Am Coll Radiol 2016;13:411–6.
[32] Alderson PO, Bresolin LB, Becker GJ, et al. Enhancing research in academic radiology departments: recommendations of the 2003 consensus conference. AJR Am J Roentgenol 2004;183:273–6.
[33] Chin MH, Covinsky KE, McDermott MM, Thomas EJ. Building a research career in general internal medicine: a perspective from young investigators. J Gen Intern Med 1998;13:117–22.
[34] Mbuagbaw L, Morfaw F, Kunda JE, et al. Tips for charting the course of a successful health research career. J Multidiscip Healthc 2013;6:163–8.
[35] Rosen EL, Eubank WB, Mankoff DA. Fdg pet, pet/ct, and breast cancer imaging. Radiographics 2007;27(Suppl. 1):S215–29.
[36] Kiser J. Molecular imaging and its role in the management of breast cancer. Clin Obstet Gynecol 2016;59:403–11.
[37] Fallenberg EM, Schmitzberger FF, Amer H, et al. Contrast-enhanced spectral mammography vs. mammography and mri - clinical performance in a multi-reader evaluation. Eur Radiol 2017;27:2752–64.
[38] Oraevsky AA, Clingman B, Zalev J, Stavros AT, Yang WT, Parikh JR. Clinical optoacoustic imaging combined with ultrasound for coregistered functional and anatomical mapping of breast tumors. Photoacoustics 2018;12:30–45.
[39] Perry RE, Parikh JR. Developing effective mentor-mentee relationships in radiology. J Am Coll Radiol 2018;15:328–33.
[40] Perry RE, Parikh JR. Mentorship of junior faculty members in academic radiology. J Am Coll Radiol 2017;14:1341–4.
[41] Busari JO, Scherpbier AJ. Why residents should teach: a literature review. J Postgrad Med 2004;50:205–10.
[42] Gunderman RB. Today's radiology resident and tomorrow's academic radiologist. AJR Am J Roentgenol 2001;177:1277–80.
[43] Linver MN, Osuch JR, Brenner RJ, Smith RA. The mammography audit: a primer for the mammography quality standards act (mqsa). AJR Am J Roentgenol 1995;165:19–25.
[44] Parikh JR, Yang WT. Breast imaging: a paradigm for accountable care

organizations. AJR Am J Roentgenol 2016;206:270–5.
[45] American College of Radiology. Commissions and committees. https://www.acr.org/Member-Resources/Commissions-Committees, Accessed date: 3 November 2018.
[46] Smith SM, Demissie S, Raden M, Yarmish G. A survey of academic radiology department chairs on hiring recent graduates as new attending physicians. Acad Radiol 2015;22:1471–6.
[47] Ellenbogen PH. Imaging 3.0: What is it? J Am Coll Radiol 2013;10:229.
[48] Gunn AJ, Mangano MD, Choy G, Sahani DV. Rethinking the role of the radiologist: enhancing visibility through both traditional and nontraditional reporting practices. Radiographics 2015;35:416–23.
[49] Savoie B, Lexa FJ, Nagy P. Radiologist technologist communication. J Am Coll Radiol 2013;10:144–5.
[50] Lesslie MD, Parikh JR. Multidisciplinary tumor boards: an opportunity for radiologists to demonstrate value. Acad Radiol 2017;24:107–10.
[51] Strife JL, Kun LE, Becker GJ, Dunnick NR, Bosma J, Hattery RR. American board of radiology perspective on maintenance of certification: part iv–practice quality improvement for diagnostic radiology. Radiographics 2007;27:769–74.
[52] Donnelly LF, Mathews VP, Laszakovits DJ, Jackson VP, Guiberteau MJ. Recent changes to abr maintenance of certification part 4 (pqi): acknowledgment of radiologists' activities to improve quality and safety. J Am Coll Radiol 2016;13:184–7.
[53] Kemp JL, Mahoney MC, Mathews VP, Wintermark M, Yee J, Brown SD. Patient-centered radiology: where are we, where do we want to be, and how do we get there? Radiology 2017;285:601–8.
[54] Gulick SL. Social media: a brave new world for doctors. J Am Coll Radiol 2011;8:366–8.
[55] Glover M, Choy G, Boland GW, Saini S, Prabhakar AM. Radiology and social media: are private practice radiology groups more social than academic radiology departments? J Am Coll Radiol 2015;12:513–8.
[56] Tso HH, Parikh JR. Leveraging facebook to brand radiology. J Am Coll Radiol 2018;15:1027–32.
[57] Thackeray R, Burton SH, Giraud-Carrier C, Rollins S, Draper CR. Using twitter for breast cancer prevention: an analysis of breast cancer awareness month. BMC Cancer 2013;13:508.
[58] Rosenkrantz AB, Won E, Doshi AM. Assessing the content of youtube videos in educating patients regarding common imaging examinations. J Am Coll Radiol 2016;13:1509–13.