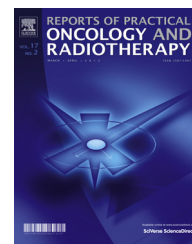




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Original research article

Intraoperative radiation therapy, opportunities for clinical practice normalization: MEDTING, a scientific platform



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ABSTRACT

Aim: To use a platform to analyze a subgroup specialized in evaluation of patients candidates to IOERT.

Background: Medting is a project that was initiated to support daily clinical activity, knowledge management and medical education by sharing information with other physicians. The project began at the “Hospital General Universitario Gregorio Marañón”, which has a dedicated oncology physician’s multi-specialist committee. There are many scientific social networks all over the world. Medting is the only platform that specializes in healthcare and has been developed for hospital purposes.

Materials and methods: Medting brings all together the relevant clinical information from electronic medical records and picture archiving about the patient to study. Subplatform Medting-IORT was created on February 2, 2012 at the Hospital General Universitario Gregorio Marañón. It has 23 members, have been registered 18 cases with 238 multimedia images.

Results: Medting started with 28 physicians and five departments. After 6 months, proof of concept period, there are 225 physicians, more than 120 medical students and 39 departments in 3 hospitals using the scientific social network. Furthermore, the project is being extended on three more hospitals in Madrid.

Conclusion: Medting gives the opportunity to oncology physicians to access all relevant clinical information with the ability to discuss case notes and view images at any time. The impact of the Medting platform in a subgroup working team to evaluate IOERT patients candidates is included in the analysis. The use of a constantly updated repository based on real cases and the documentation of the internal activity of the tumor committee beyond the medical record, has become an extraordinary tool for teaching, training and learning.

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1. Background

Medting is a project that was initiated to support daily clinical activity, knowledge management and medical education by sharing information with other physicians. The project began in March 2010 and is active in specific programs (including radiation oncology).¹

Medting can be defined as a Scientific Social Network for medical professionals. The main purpose for which it was created is to support the activities of the Tumor Committee.

The project began at the "Hospital General Universitario Gregorio Marañón", which has a dedicated oncology physician's multi-specialist committee. Therefore, with a Scientific Social Network clinicians can work in a more efficient and interdisciplinary manner, improving knowledge surrounding clinical problems and helping to improve medical care. The hospital determined that using a scientific social network facilitates collection of data, allows greater interaction and more efficient sharing of anticipated information with other physicians and oncology centers. All these advantages have led to the expansion of this network to five additional hospitals.

There are many scientific social networks all over the world. In the USA, the following may be mentioned: sermo, physician connect, student doctor network, relaxdoc, clinical village, iMed exchange, medtrust, MyPacs. . In Europe we have: doc2doc, onMedica, Coliquio, Docchech, Esanum, Doox, Docatus. . .

Some of these networks function as follows:

- Sermo is an online community for physicians founded in 2006 by Daniel Palestrant. Users can register after verifying their status as licensed practicing physicians and receive a pseudonym of their choice. This pseudonym and the doctor's specialty are the only pieces of information that other doctors will be able to see automatically. Doctors post observations and comments, create and respond to surveys, and browse medical articles within the site. Members say they do not mind their conversations are accessible to others, particularly since their identities are concealed.²⁻⁴
- Coliquio is a trusted and secure platform accessible exclusively to physicians, offering real time dialog, exchange and interaction in clinical and non clinical forums, knowledge centers, treatment guidelines, certified education resources and latest medical news.⁵
- MedTrust is a scientific social network that was created in order to provide excellent management and healthcare staffing service in the commercial sector. Actually, it is considered a veteran owned business providing medical staffing solutions and service to their customers at numerous locations around the United States.⁶
- Doc2doc is an online social and business-related networking website such as Facebook or LinkedIn. The aim of this social network is to promote public health by providing powerful instruments for communication and education.⁷

David L. Graham said that: "Social media, when applied to medicine, can have three uses: it can accelerate the

development of communities (both personal and professional), it can serve as a marketing tool, and it can function as a method of knowledge dissemination".⁸

2. Aim

Medting is the only platform that specializes in healthcare and was developed for hospital purposes. A subgroup specialized in evaluation of patients candidates to IOERT has used the platform to explore the interest in recording and discussing this specific medical activity. The specific characteristics related to IOERT activity are described.

3. Materials and methods

Hospital General Universitario Gregorio Marañón has a dedicated oncology physician's multi-specialist committee, where they discuss each individual case, have specific treatment targets and review of patients who are newly diagnosed. Each case is presented and agreed by consensus to create the best and optimal treatment including clinical, surgical, therapeutic and/or palliative care. Physicians gather information from different sources and share it in the committee. Normally, such information is presented as a power point presentation. Medting brings all together the relevant clinical information from electronic medical records and picture archiving about the patient to study. In this way, the physician can share virtually the case and not only on the day of tumor committee. Within this context, Medting would permit physicians to gain opinions in advance of the weekly meeting, share the information with other oncology centers and also enable ongoing dialog with both immediate colleagues and specialists in other departments. Therefore, this Scientific Social Network enables to focus on clinical case presentation and image sharing, supports clinical decision making and is a place where researchers, clinicians, medical students and residents can share and learn.

As a web site where any medical professional can share clinical cases, images or videos, incorporating their own files and browsing the information that already exists (the system protects data confidentiality). The potential for quality clinical practice is promoted. A specific functionality is integrated from other systems, such as Pubmed, to provide the access to a free digital archive, or Snomed, allowing to narrow a search in cases which the user is interested in, is also available.

Subplatform Medting-IORT was created on February 2, 2012 at the Hospital General Universitario Gregorio Marañón. It has 23 members, have been registered 18 cases with 238 multimedia images (Fig. 1).

This subplatform completes each case study in the following three distinct steps:

- First is a narrative report of the case, presenting the patient's clinical data; tumor type; staging; therapeutic strategy followed, including whether the patient received adjuvant treatment; type of surgery; IORT... This component registration includes all information needed to fully evaluate the case complexity (Fig. 2).



Fig. 1 – Front page of MEDTING website.

- Second, there is a visor with imaging recording of the most relevant studies: CT scans, MRI and, particularly in the IORT group, multimedia images are added of a treatment planning system (Radiance). Thus, illustrated information is provided about the typical case analyses, bevel, energy, dose, surgical approach, exact location of the tumor and its relationship with adjacent organs... (Fig. 3).
- Finally, the third element available in the case-oriented-platform is formed by the set of comments, ideas, opinions and contributions of other professionals. This will create a tool that allows a multidisciplinary communication to study each case, so as to follow the evolution of each patient recorded.

A maximized, complete, comprehensive and continuing evaluation in each individual case is facilitated building a multidisciplinary approach.

4. Results

Medting is a project started with 28 physicians and five departments. After six months, there are 225 physicians, more than 120 medical students and 39 departments in three hospitals using the scientific social network. Furthermore, the project is being extended to three more hospitals in Madrid.



Fig. 2 – First element of the platform: clinical report.

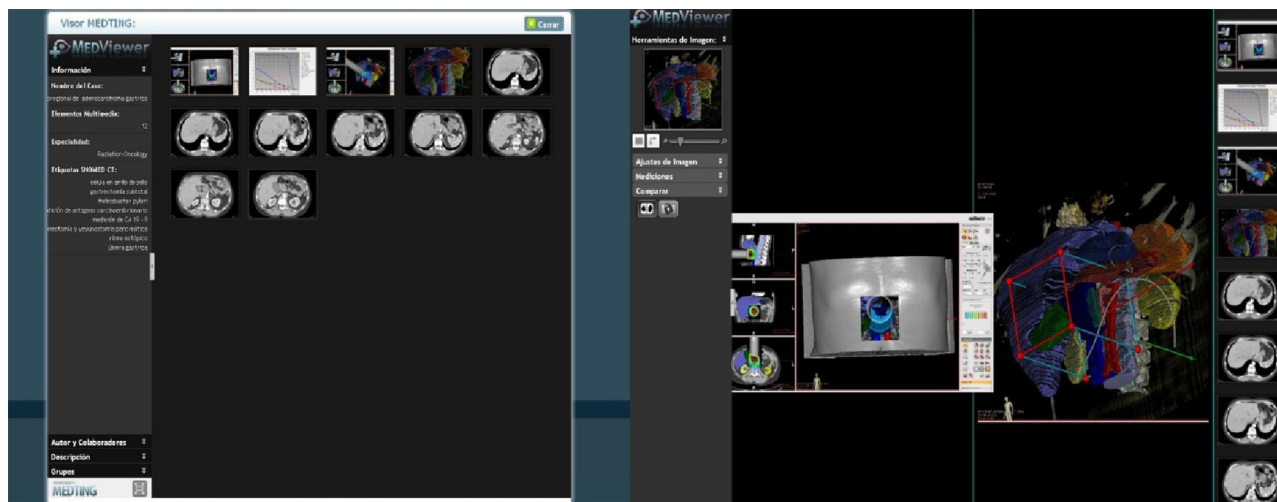


Fig. 3 – Second element of the platform “viewer”: example of an treatment planning imaging for an IOERT procedure.

This web site involves Medting software based on Intel architecture. The collaboration is based on providing a Web-based platform, which is the purpose of Medting, and developing capabilities that include data encryption, graphics features and powerful processing, all ensured by the Intel architecture. These features are essential for a social network and “cloud architecture”.

The goal of this undertaking was to support professional collaboration, to share experiences and to learn at both national and international levels. In order to be launched, this project should be easy to use, providing security and protection of private data, and be incorporated seamlessly into the existing technology infrastructure.

Thereby, a combination of hardware, software and process is provided to sufficiently support the underlying platform.

Finally, there was only a technological challenge: it was important for this social network to be available always and everywhere. This objective was achieved. Mobile workflow, where information is available as and where it is needed, positively impacts the quality of clinical decisions.

Keeping up a regular contact with the patient data enables to make decisions based on full knowledge, to reduce potential errors and to minimize the chances for the patient’s conditions to change during the time between diagnosis and treatment delivery.

The results obtained from the use of the subplatform IOERT-Medting are as follows:

There have been 18 cases registered. Six rectal tumors, 4 sarcomas, 3 breast tumors, 2 cervix tumors, 1 pancreatic tumor, 1 gastric tumor and 1 endometrial tumor.

4.1. Rectal cancer

Of the 6 rectal tumors, 4 are primary tumors and 2 recurrences. Only one of the primary cases received neoadjuvant therapy. Surgical treatment: 2 were treated with distal colectomy, one with abdomino perineal amputation, one with low anterior resection and 2 with ultralow anterior resection. The 6 tumors received IOERT.

4.2. Soft tissue sarcomas

Of the 4 sarcomas, 2 are primary tumors and 2 recurrences. Surgical treatment: two were treated with adhesiolysis, one with hemipelvectomy and another one with bloc resection and splenectomy. The 4 tumors received IOERT.

4.3. Breast cancer

Of the 3 breast tumors, all three were primary. Surgical treatment: 2 were treated with lumpectomy one of which included lymphadenectomy, and the other was treated with segmentectomy. The 3 tumors received IOERT.

4.4. Uterine cervix cancer

Of the 2 cervix cancer, both were recurrence tumors, one intercavo-aortic and one para-aortic. Surgical treatment: the first was irresectable, and the other one was treated with lymphadenectomy. The 2 tumors received IOERT.

4.5. Pancreatic cancer

The only reported case of pancreatic cancer was a primary tumor; it was treated surgically with hemicolectomy and pancreaticoduodenectomy. It received IOERT.

4.6. Gastric cancer

The only reported case of gastric cancer was a recurrence tumor; it was treated surgically with pancreaticoduodenectomy. It received IOERT.

4.7. Endometrial cancer

The only reported case of endometrial cancer was a recurrence tumor; it was treated surgically with cytoreduction with pelvic exenteration. It received IOERT.

5. Discussion

When Medting was created, there were three essential challenges to meet:

- The appropriateness of the social networking aspects of the project for clinical use had not previously been demonstrated. Expectations and outcomes were defined in the context of a proof of concept, which ran over five months.
- A “community manager” was needed to be able to resolve questions and problems that can appear as the physicians use the social network and to overcome the initial incredulity of managers and clinicians in an oncology context.
- The project was not initially seen as a priority. The aim was to check if the application of a scientific social network was possible in a clinical context, so the approval of the health managers was required.

The proof of concept project was launched at the Hospital General Universitario Gregorio Marañón. Until then, physicians had to collect the information for the Tumor Board presentations from different sources including the electronic hospital chart and put them into a format that would be easy for their colleagues to understand. Generally, each case was presented on paper, or at best as a Microsoft Power Point presentation. Therefore, the first impression that emerged from the use of this type of Scientific Social Network was characterized by a high level of user acceptance and satisfaction.⁹

The results are explained because Medting gives the opportunity to oncology physicians to access to all relevant clinical information with the ability to discuss case notes and view images at any time. Also, all comments and all the knowledge provided by any colleague are stored as part of the discussion process and the cases can be shared with physicians anytime and anywhere.

The value of this social network within the context of oncology cannot be overstated. Cancer is a multidisciplinary disease in both diagnostic and therapeutic terms. The management decision in these patients is based on biological characteristic of neoplastic tissue and the different surgical possibilities (radical, conservative...). The use of pharmaceutical compounds and radiation therapy technology should also be included in this discussion. Therefore, there is a clear need for an interdisciplinary approach to cancer treatments. This innovative project demonstrates the need of using social networks for clinical collaboration and knowledge sharing. So, taking into account that the therapeutic cancer approach is based on an interdisciplinary communication, improving this aspect will obviously optimize the oncology treatments and diagnosis. Furthermore, the use of a constantly updated repository based on real cases and the documentation of the internal activity of the tumor committee beyond the medical record, has become an extraordinary tool of teaching, training and learning.

All oncological institutions, international scientific oncological societies, expert cancer hospitals, advanced health institutions and medical specialists practicing oncology stress the need and usefulness of a multidisciplinary management of

cancer patients. This requires good communication between professionals in order to take charge of the patient, as well as a method to share all patient information in the decision making process. MEDTING enables to share all patient data that could be useful in medical research, as well as images ranging from imaging tests such as X-rays, CT, MRI, to images of histological and pathological tumor and also allows to add laboratory data and everything that is necessary to develop a diagnostic and therapeutic process based on a consensus of opinions of different experts in different branches of medicine that can provide knowledge to optimize clinical practice. Users in addition to presenting their view on the cases can also have access whenever and wherever they want. All this makes this web site one virtual tumor board that improves patient multidisciplinary approach, which results in better diagnostic and therapeutic decisions by consensus and is likely to improve oncology clinical practice. All this is not confined to any individual hospital as the scientific social network can be expanded to other hospitals in a national or international level. At the moment, the international sharing of cancer knowledge is based on access to databases that hold information on clinical trial selections or evidence-based diagnostic and treatment recommendations.¹⁰

Standardization of clinical practice in super-specialized treatment modalities such as IOERT is a mandatory requirement for quality care. Our experience with the IORT subplatform is consistent with the added value of medical evaluation exhaustively found for the Tumor Board project and the improved multi-specialist contribution to case-by-case evaluation. Subgroups and sub-platforms have an optimized potential for externalizing opinions, care consultation with expert physicians and groups and relevant teaching contribution of typical cases analyses, self-training and electronic tutorials.

Additionally we are considering extending the project to different hospitals in Spain for other radiotherapy applications, treatment planning evaluation,¹¹ comparison of dosimetric characteristics¹² and for patients with different cancers types, treated not only through IOERT.

6. Conclusion

The scientific social network improves clinical outcomes while ensuring better communication among clinicians. Medting provides a new model of international oncology collaboration. It can quite easily be globalized while retaining its individual nature so that patients can receive multimodal cancer treatments in the form of personalized care.¹³

Conflict of interest

None declared.

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