Clinical Journal: A Collaborative Shared Medical Workspace

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Abstract

We describe our findings from a cooperative design effort of a shared medical workspace used in multi-disciplinary team meetings, as well as during other activities in a patient care pathway for highly specialised care. In collaboration with surgeons, sketches of such a system have been developed and evaluated. Our findings point out the importance of overview and visualisation of the information.

Keywords

Electronic patient record, collaboration, multi-disciplinary team meeting, information visualisation

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous. J.3 Medical information systems

General Terms

Design

Introduction

Over the last ten years there has been an increased focus on multi-disciplinary teams in health-care, as medical specialists of different disciplines work together in the treatment of patients [1]. Important activities of the patient care pathway include multi-disciplinary team meetings (MDTM), where involved specialists gather to discuss patient cases, decide on diagnosis

and treatment, as well as plan for treatment (e.g. how to perform surgery). Several studies of MDTMs focus on, for instance, the use of technology [2,3]. To our knowledge, there are, however, few studies that present suggestions on how information during MDTMs can be managed through better technical solutions.

We describe our work on a cooperative design activity, where we together with surgeons at a gastro surgical department (Gastro) design a system we have named *Clinical Journal*; a collaborative, shared workspace for visualising and interacting with patient information. Primarily intended to be used at MDTMs, it can also support a number of activities throughout the patient care pathway. The system provides an overview of information from different sources the various medical specialists currently use, (e.g. the electronic medical record system and radiology imagery system).

The setting

Gastro is responsible for the highly specialised care of patients suffering from diseases in the upper part of the abdomen. Patients are referred to Gastro from other hospitals within the region, but referrals may also come from hospitals on a national level. It is therefore important that the referring physicians are able to participate in different activities during the patient care pathway (e.g., the weekly MDTMs).

The patient care pathway at Gastro is a standardised process, from referral to sign-off, and includes a number of activities: 1) coordination of referrals where a senior surgeon (the coordinator) in collaboration with radiologists decide if further examinations are necessary, 2) the decision meeting, an MTDM where decisions on diagnosis and treatment is made, 3) the

pre-operative meeting, an MDTM where the surgical strategy is planned, 4) the surgical procedure, 5) after care and rehabilitation, and 6) the post-operative meeting, an MDTM where treatment and patient outcome is reviewed. To achieve good collaboration with the referring hospitals, these activities should be made available. Today, collaboration exists when the referring hospitals participate over video at the MDTMs, and sometimes in person in the surgical procedure. Referring hospitals can also easily get in contact with the coordinator by phone if they want to find out more about "their" patient.

Methods

We have conducted field studies at Gastro since 2007, including all stages of the patient care pathway. Particular focus has been paid to the MDTMs and the coordination process. Being partly employed at the hospital, the first author has spent approximately two to three days per week at Gastro, which has allowed informal chats with the surgeons during breaks. We have also conducted formal observations, interviews and workshops. The material collected during the field studies generated the first ideas of the Clinical Journal.

In our design work with the surgeons we have: 1) held workshops to communicate the idea of the Clinical Journal and to understand the patient care pathway in more detail, 2) prototyped together with a senior surgeon, and 3) evaluated the sketches with other surgeons at Gastro.

Results

The electronic patient record (EPR) system used at Gastro is well appreciated and efficient when entering information. However, it is quite limited in providing an
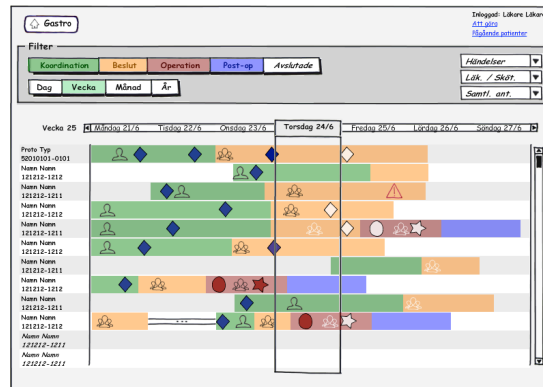
Figure 1: Overview of the patients in the patient care pathway in Clinical Journal. Each colour describes a phase in the pathway (e.g. coordination and decision). The icons represent different activities (e.g. radiology examination).
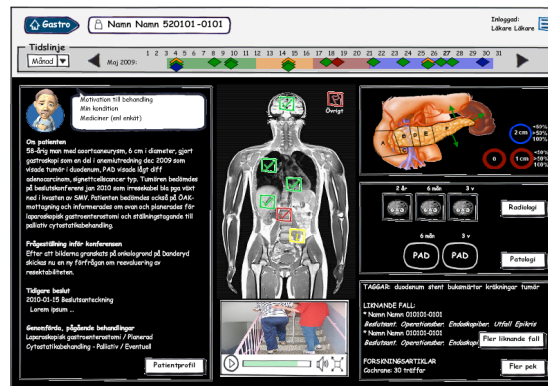

Figure 2: The patient overview presenting a short text about the case, the comorbidity image, a short video visualising the operability, the detailed image of the organ in focus, and relevant radiology material.

overview of information regarding a patient or a collection of patients. Therefore, the overview of patients throughout the patient care pathway in the system we introduced (see figure 1) has been highly appreciated by the surgeons. One surgeon said: *the icons are the strength in this ... there must be icons that indicate that an activity has been conducted or will be conducted*. This was especially important in cases where the patients are returning, after some time, to the next step in a surgical procedure. They also pointed out other units that would benefit from this kind of overview (e.g., the care planning unit and outpatient clinic). This overview can also be used when presenting patients at an MDTM, using filtering functions that generate a list of the patients being discussed. Today, such lists are generated from the EPR system, containing limited information about each case, and e-mailed to participants by a secretary.

From the listing, by clicking on a particular patient, the overview for this individual is presented (see figure 2). In the patient overview one important part is the comorbidity image of the patient shown in the middle (a design suggested by the surgeon participating in our prototyping sessions). The purpose of the image is to quickly develop an understanding of how well the patient is (i.e, the operability of the patient). If there is a red checkbox on the head the patient is not mentally stable and therefore not operable. Another important part is the generic pancreas image in the upper right corner. (also created together with the surgeon), that provides a quick overview of tumour localisation and how much of the blood vessels are engaged (i.e, the resectability of the tumour). These two generic images of the patient and of the organ provide a quick overview of the operability and resectability, two of three issues focused on at the decision meetings.

In one of the initial workshops with the surgeons, where we focused on the information flow in the patient care pathway, it became clear that technology support for visualising information during the pathway could also reduce the risk of actually loosing or changing information between activities in the pathway. One surgeon asks: *What's the communication between these two steps today?* Another surgeon replies: *It doesn't exist.* The first surgeon says: *Then it's a great need [to improve it].* Also, the fact that information is visualised in other ways than plain text was stressed by the surgeons in an evaluation workshop of the sketches: *I can see a little danger here ... that you don't see the trees because of the forrest [pointing at the text part to the left in figure 2].* They also pointed out that the text needs to be short and well structured. The participants at the MDTMs do not have time to read long text parts. The number of patients being discussed during one hour gives less than an average of five minutes for each case. If text is included it should be condensed into a short text showing only what is relevant.

Our idea is that surgeons during MDTMs, or at any point during the patient care pathway, interact with the Clinical Journal through mobile devices such as tablet computers or smart phones, or by larger touch displays. The daily movements between places at the hospital (e.g. surgical office, patient wards, outpatient clinic, meeting rooms, etc), as well as the lack of facilities and space in the room in which the MDTMs are held indicate that such devices will be useful, but is something that we will evaluate in our further studies. The possibility for the surgeons to use a system like the Clinical Journal would drastically change the way MDTMs are held today, where only the person presenting radiology or pathology information is involved in the interaction. We are currently implementing the Clinical Journal on a combination of iPads and iPhones, with a server backend, allowing for interaction and cooperation by multiple participants.

Conclusions

Our findings from design and evaluation of the Clinical Journal system; a collaborative shared workspace used during multi-disciplinary activities in patient care pathways, show that: 1) information needs to be visualised graphically to give a quick overview of the operability and resectability, 2) an overview of patient information is necessary to generate the required situational awareness, 3) the most relevant information should primarily be displayed or short and structured, but, 4) access to all available information should be supported, 5) interactive and collaborative tools should be simple to use.

Conclusions

References

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