

Complex diagnostic work in a surgical setting

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Background

GastroCentrum at Karolinska University Hospital, Sweden, is responsible for all surgery within the upper gastrointestinal tract in the Stockholm region. In order to reduce travel time for both the patients and medical specialists from local hospitals, and to disseminate knowledge and experience to the local hospitals the health care process used at GastroCentrum is network based involving all local hospitals within the region. In reality this means that the patient's investigation as much as possible takes place at the local hospital, but the decisions about the diagnosis and the treatment are made within the network with GastroCentrum as the hub. GastroCentrum also has the overall responsibility for the patient throughout the whole health care process.

There are about 25 surgeons at GastroCentrum focusing on the upper gastrointestinal tract. The surgeons' skills and experiences differ from being senior with maybe 20 years experience or more, to not yet examined surgeons doing their specialisation. The radiologists are central in the process because they are the ones that often make a first diagnosis. The radiology pictures also serve as a base for the discussions about the diagnosis and when coming to a consensus about the treatment. Other disciplines involved in the health care process are oncology, pathology, hepatothology, transplantation surgery, internal medicine, and anaesthesiology.

The diagnostic process within this highly specialised health care is quite complex since not only one person's competence is involved, but several. In each case several medical disciplines look at, understand and agree on the problem from different perspectives. From a radiology picture a shadow can be identified as something that most likely is a tumour, but it is also important to understand what kind of tumour it is, how it behaves, how it may respond to different kinds of treatments, how it grows, and so forth. It is also important to understand the patient's condition in general, if he or she is mentally and physically capable of managing severe surgery. The better the diagnosis is, the better the decision can be of how to proceed with the investigation and treatment of the patient.

In this work we focus on the multi-disciplinary video-mediated consensus meetings held regularly every week within the areas of liver, pancreas and esophagus/ventricel. There are three one hour meetings per week, where disciplines from several hospitals participate to discuss the diagnosis of the patient, to come to a consensus about how to treat the patient, and to share best practices, knowledge and experience.

Research questions

We are especially interested in four aspects of this complex diagnostic work. Our aim is to understand

- multi-disciplinary collaboration during a consensus meeting, e.g. how a case proceeds if a necessary competence is missing and how the participants communicate their competence,
- the participants' role in the conversation, e.g., turn-taking, transitions, etc,
- the role of the technology during these meetings, e.g., how the quality of the sound affects the discussion, what purpose the video image play during a meeting, and if the radiology pictures can be communicated using 3D or haptics,
- the effects of overcoming the distance between local hospitals and the university hospital, e.g., how the network based health care process affect the participants.

A consensus meeting discussing liver patients

During nearly one hour nine patients were discussed in a video-mediated liver conference in June 2007. The number of people attending the conference was lower than usual because of summer holidays. From Karolinska in Huddinge seven persons were active (five other persons were attending the conference), and from the three local hospitals (Norrtälje, S:t Göran and SÖS) there were one person active from each. From each of Norrtälje and S:t Göran two surgeons were active when their patient was discussed, and from SÖS an oncologist was active during the whole conference because of his speciality (all oncologists belonging to Karolinska University Hospital are either located at Karolinska in Solna or at SÖS). Usually there are more than one person present from the local hospitals, especially from SÖS. Of the nine patients discussed during the meeting, two had been referred from Norrtälje and S:t Göran. Each consensus meeting has a senior and experienced surgeon chairing the session.

The conference process: Each patient session begins with the chairing surgeon, or the surgeon responsible for the patient, introducing the patient by describing his or her medical record. This is followed by the radiologist describing the findings while showing the radiology pictures. Thereafter, a general discussion, usually led by the chairing surgeon, begins about the diagnosis and possible treatments. The session ends by the chairing surgeon summarising the diagnosis and the decision.

Discussion participation: From the nine patient sessions it appears that only the persons involved in the treatment of the patient are active in the discussion. Senior surgeons usually participate in the discussions even though they are not directly involved in the specific case. At this conference there was only one senior surgeon present. If an ultrasound has been made, or if the case involves a transplantation, then that specialist is either asked or takes the initiative to be part of the discussion. The specialists that are active during all sessions are the surgeons, radiologists and oncologists.

Transitions (or turn-taking): At this conference, two of the cases are introduced by surgeons at the local hospitals, three by one of the surgeons, one by the hepatologist, and two by the chairing surgeon. In some of the cases the chairing surgeon adds to the introduction or the surgeon ends the introduction by saying “*what does it look like*”, explicitly giving the turn to the radiologist. In the other cases these transitions, from the introduction by the surgeon to the explanation of the radiology pictures, go seamless. Words do not need to be spoken. There is local knowledge about the conference process among the participants that in many cases make the transitions from one person speaking to another seamless, at least in the beginning of a session.

There are more turn-taking problems during the general discussion, after the introduction and the explanation of the radiology pictures. The problem appears both within the same site, and between different sites. There are indications that when a turn-taking problem occurs between different sites, then the recovery is quicker than when it occurs within the same site. One reason for this can be that the people participating from external sites appear to try to speak loud, clear, and slow.

Sometimes the turn-taking is explicit in form of a directed question. For example, in one case the chairing surgeon turns to the oncologist at SÖS and says “*It might be suitable to do a resection, what do you say Steve?*”. In other cases the discussion is open for anyone to enter through a moment of silence.

Multi-disciplinary participation: In one of the cases it is not clear how to proceed with the treatment of the patient because there are competencies missing during the conference. The chairing surgeon says “*we are not complete at the conference here, I will discuss with additional colleagues in the team here, but preliminary I believe it is resectable.*”. Later on in the discussion the chairing sur-

geon says “*Is it ok if I discuss with colleagues and that we contact you on Monday [four days from the day of the meeting] or so?*”. The decision is delayed causing the patient some trouble to have an obstructed flow of bilejuice. Even though a senior surgeon is present during the conference (in this case the chairing surgeon), his competence is not enough to come to a decision. In this complicated case a surgeon with special operation skills is needed, and there are only two such persons at Karolinska in Huddinge.

Disturbing elements: There is a constant beeping in the room during the conference, and people are often walking outside to respond to the call. These noises, as well as people coughing, moving and making other sorts of noises, affect the sensitive microphones. For external sites these noises may prevent them from following the discussion. From a questionnaire study earlier this spring, people from different hospitals said (translated into English):

“The sound is difficult. There are large disturbances when people com in, doors open, beepers, and so forth. ... It is more difficult to keep others attention if there are a lot of disturbing noises.”

“It becomes very fragmented if several happen to talk at the same time (which you do) or if some other noise disturb, for example beepers ... I also sometimes have problems hearing what is said, and the sound is extremely important because there are important decisions that will be made based on what is said during the conference.”

“Now and then the sound disappears ... cannot follow the discussion during seconds to minutes, then the context is lost. Some participants cannot be heard, they probably talk to quite.”

“I believe that those who participate in a conference need to learn to talk clearly. Many mumble and talk unclear ... It is also a risk that you misunderstand if the sound is not optimal, which could lead to making wrong decisions around a patient.”

A specific case: One of the patients discussed did not have a clear diagnosis. We will use this as a case to illustrate the complexity of diagnosing patients with these severe diseases.

Chairing surgeon: “... a patient that is in the nursing ward unit now and we have made a two-step resection on the liver because she earlier had a cancer in the left colon flexure that was operated in -05. Later she got metastases in the liver and we started to operate and clear the left liver lobe ... in June -06. Then she had nine months chemotherapy post operative, and then she has developed metastases that we operated now in June with local resections. An ultrasound was made pre and inter operative and the patient was at that time tumour free. But after the suspicion of an abscess, a CT have shown further changes in the liver ... and lungs. We shall discuss what this is and how to proceed.”

Radiologist: “[at the same time as he shows different radiology pictures] on further review we found more liver lesions ... in total there are four lesions that can be liver metastasis ... [cutting out a longer explanation about changes, sizes, comparisons with older pictures] ... and in the lungs we have some lesions that can be unchanged from -05 ... but then there are some new and they are not described earlier, one very small here in the left lower lobe, and one in the upper lobe ...”

Oncologist at SÖS: “They are metastasis suspicions then?”

Radiologist: “They are so very small so it is difficult to say, but then there are other infiltrations here ... we don t know what they are .. if it is infection, does she have a fever, does she have pneumonia?”

Chairing surgeon: “Yes she has had signs of infection during the post operative process ...”

Oncologist at SÖS: These changes in the liver then are certainly metastases, not any presser?

Chairing surgeon: mainly they look like metastases usually do

Chairing surgeon: What do you say Bob, you recently made an ultrasound?

Bob (an ultrasound radiologist): a metastasis the one which is dorsal capsular xxx to the left, while the others situated around the resection surface there, especially the one that is cranial, that one I can't see, further down there are some clips, not that either, there I get a change but the contrast does not load and it does not look like a typical metastasis

Oncologist at SÖS: no the larger change is 14 mm [now Bob starts talking at the same time]

Bob: xxx capsular, I think it is more post operative

Radiologist: but this is new, and it is very high up, it is extremely high and it must be difficult to reach by ultrasound so

Bob: [pointing from the back of the room at the radiology pictures in front] there I can see one that certainly is a metastasis, then one that in the third sub capsular xxx

Radiologist: here that one was 8 mm and now it is 12 mm, at this August investigation -06 it was not possible to see any lesion, so it is not probable that this should be post operative, then it should have been largest here, I think, and then it should have decreased, this is the other way around, that it was not there, and then it has increased

Bob: [mumbling in the back] I cannot see any metastases there

Chairing surgeon: most probably then four new metastases

Radiologist: yes

Chairing surgeon: What do you say Steve, about coming chemotherapy, not the patient is in a post operative stage and not that well yet, but this is new information and if we want to think about any other strategy here then it could be possible with chemotherapy.

Oncologist at SÖS: yes [sound is disappearing] operation six months cytostatic, then she had three months post operative cytostatic, so then it is the change of preparation to oxadiplatin based cytostatic, and she can get in [her home town]

The discussion goes on and in the end the chairing surgeon concludes “*but then we will do so, we can state that this is what it looks like, and rest on the decision for a while, and then discuss chemotherapy when she has recovered after the operation*”.

The excerpt illustrates the multi-disciplinary discussion, how the participants talk at the same time, how the sound failed at one time, but that it did not affect the discussion, and so forth.

Summary

The multi-disciplinary participation during these conferences is important. The better the preparation of the conference is, the more is known about what competencies that will be required during the meeting. In one of the cases discussed there was a lack of a senior surgeon with high operation skills. There are not many persons with this competence, and such situations will occur because of holidays, present operations, and so forth. The question is how these situations are managed in the best possible way. Is it possible to identify the need for this competence in the preparation of the conference? Is it possible to come further in the discussion without this competence, e.g., through some kind of searchable database with previous cases? We do know that the lack of a specific competence may lead to a delay in the treatment of the patient or that wrong decisions are made.

From the excerpt above we can see that not only the radiologist need to point at the pictures, which they can do while they are running the computers. Also people in the audience may need to do the same in their explanation. In the above excerpt Bob is pointing at the screen from the back of the room without any chance of making people aware of what part it is he is pointing at. He needs to direct the radiologists behind the computer to show the right picture and point at the right part of the picture.

Even though the video-mediation during the conference appear to work relatively good, there are some minor problems that may affect the possibility for participants at external sites to follow the discussions. This may affect the external participants' interest in participating in general, not only when they are involved in a case. The discussions benefit from other people being there, people with knowledge and experience that can be fruitful in the discussion. If it is difficult to teach the participants how to act during these conferences, i.e., speak slow, clear and loud, and do not make any unnecessary noises, then the technology and/or the premise needs to be adjusted.

The most important part with the conferences is that they make it possible to overcome distances. Despite the physical location of the patient, it is possible to offer the highly skilled competencies that are situated at one hospital within the region.