PB-PG-0909-20226 – NIHR Research for Patient Benefit Programme – Final report

Project title: The Interhospital Telemedicine Pilot Project

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Plain language summary

Patients in a District General Hospital (DGH) Emergency department sometimes need input from specialists in the nearest teaching hospital. The DGH doctor usually rings the specialist with their findings but the quality of this information depends on the skill and experience of the DGH doctor who is often a trainee. Video conferencing between the patient and specialist might improve the information available to the specialist and enable them to confidently advise on local treatment in the DGH or transfer. We planned to test the use of video conferencing across all patients presenting to a DGH Emergency department (Horton General Hospital ED) who needed a specialist opinion to see if it was a useful in deciding whether or not a patient should be transferred to the nearest teaching hospital, in Oxford and whether patients and medical staff were happy using it.
The study was designed in two 6 month time periods for comparison before and after introduction of video conferencing. During the first 6 months we collected details on all patients who were transferred to Oxford and admitted to HGH. We found that most patients were referred to a small number of teams in Oxford. We collected details of the patients involved and had meetings with each of the specialist teams to see how videoconferencing could help. We found that there were already clear patient pathways which ensured that appropriate patients were transferred to Oxford and that in most cases videoconferencing had little to offer. We looked at the number of patients who might be helped and it was too small to make this a regular part of doctors' work. It was unlikely that occasional use of video-conferencing would happen unless there was a clear and immediate benefit from it. There was also an issue over the type of videoconferencing equipment to be used. Large screens were difficult to use in the confined space of the ED but smaller devices (tablets, I-Pods etc) could be easily removed from the department and would need regular replacement. For all the reasons given above, we decided to bring the study to an end before starting the second 6 months because it was clear that, in an Emergency department which was well supported by guidelines for the management of difficult patients, able to rely on phone calls with specialist teams and able to transfer X-Rays and photographs to Oxford for discussion, video conferencing had little to offer and was unlikely to be used.

Keywords
Emergency, telemedicine, DGH, specialist, plastic surgery, OMF, ENT

Summary of research findings

Background

Tertiary level specialist input may be needed for patients in a District General Hospital (DGH) Emergency department to help with diagnosis or to provide complex care beyond DGH capacity. Communication is usually by telephone and decisions based on reported history, examination and preliminary investigations often performed by a junior trainee. The specialist has few options for further reliable information at this stage and there is pressure to make a quick decision. The safest option is usually patient transfer to the tertiary centre but that interrupts continuous care of the patient, removes them from full resuscitation facilities during transfer and isolates them from family and friends. Inappropriate transfer also wastes resources in the tertiary centre and ambulance service. There are other patients in whom the need for early specialist input goes unrecognised and, as a result, they do badly. These difficulties in interhospital communication and patient transfer might be helped by use of real time video conferencing ('telemedicine') between patient and local clinician at one end and specialist clinician at the other. This could confirm the need for transfer but allow it to be timed more appropriately or support continued care in the secondary care hospital. Telemedicine, using videoconferencing, has allowed major Emergency departments to provide support for smaller units in remote settlements and for minor injury units. Tertiary level specialities have set up their own telemedicine services, particularly in cardiology and stroke medicine.

Our hypothesis was that telemedicine facilities were likely to be more useful in the DGH Emergency department if used flexibly across a range of conditions to communicate with specialist care. We set up a pilot study using a single DGH Emergency department, at Horton General Hospital, Banbury, which transfers approximately 800 patients per year to specialities in Oxford.

Aims

To determine whether use of real time videoconferencing for all specialist consultations between the HGH ED and Oxford:

1. was feasible.
2. was acceptable to patients and clinicians
3.had potential to improve patient safety and reduce waste of resources.

Objectives

The study was designed as an observational study 6 months before and after installation of video conferencing.

In the first 6 month phase details were collected prospectively on all patients presenting to HGH Emergency department requiring specialist advice from Oxford or who were admitted to HGH. The presenting problem and speciality involved was recorded. Data was collected on their subsequent pathway, length of stay and outcome (discharge or death in hospital).

A series of discussions were held with HGH and Oxford based clinicians most frequently involved regarding the precise design of the telemedicine intervention

The study was curtailed at the end of Phase 1 for reasons detailed below.

Findings

Between 16th January and 15th July 2012 18,799 patients were seen in HGH ED. Of these 413 were transferred to the John Radcliffe Hospital in Oxford and 3659 were admitted directly to HGH.

Table 1. Transfers from HGH ED to Oxford

Speciality	No patients
Plastic surgery	98
Ophthalmology	88
ENT	75
Paediatrics	39
Oral&Maxillofacial surgery	32
Neurology	19
Vascular Surgery	15
Urology	13
Stroke Medicine	10
Cardiac Medicine	9
Trauma	7
Renal Medicine	2
Colorectal Surgery	1
Gynaecology	1
Miscellaneous	4
TOTAL	413

Data on speciality under which HGH admissions occurred were analysed for the first 3 months of this period (1539 patients) and showed that the following were most common:

Speciality	No.Patients	% Total
General Medicine	373	24.24
General Paediatrics	213	13.84
Gerontology	162	10.53
Cardiology	142	9.23
Chest Medicine	123	7.99
	1013	65.83.

Hardware:

We had a Polycom trolley mounted video conferencing unit available which could be moved to the patient's trolley in the ED to provide the clinician in Oxford with a high resolution image of the patient via a controllable unit mounted camera. It became clear from observation and discussion that moving such a large unit into a confined cubicle area would take time and effort with associated inconvenience to staff. It could only be justified if there was a clear and immediate benefit to patient management. We therefore looked at alternative technology for providing video-conferencing and considered tablets, I-phones and I-pods.

Information Intervention:

1. Plastic surgery/ OMF Surgery

Most transfers relate to facial or hand fractures. There are protocols for which patients to transfer and most decisions regarding these are based on radiology images which are accessed easily from both HGH and Oxford.

Most facial lacerations are sutured at HGH and there are guidelines on transfer. There appears to be no advantage to transmitting an image or holding a videoconference with the patient except in the case of children in which case having an image would allow surgical closure to be planned without disturbing the dressings beforehand. However digital photographs can be taken and stored on 'Photoweb' within the Trust in this situation. Occasionally images of intra-oral lacerations might assist management decisions but getting good images is extremely difficult.

2.Ophthalmology

Most patients attending HGH ED have had trauma to the front of the eye. There is a slit lamp on site and 3 ophthalmology clinics at the HGH during the week. Most patients are sorted out on site and followed up within 48 hrs in clinic if necessary. The few cases which need transfer are discussed on the phone and the clinical opinion was that neither a direct detailed history from the patient (via a video conference) nor video or still images would help in management decisions.

3.ENT

Most transfers were because of persistent epistaxis. There appears to be no advantage to videoconferencing or further images sent from HGH in these circumstances. Occasionally patients present at HGH ED with compromised airways. These are best managed by the trained senior ED staff immediately at hand on site and rarely need immediate support from ENT specialists in Oxford although they may be transferred to their care subsequently. Again there seems no advantage to videoconferencing in these circumstances.

4.Paediatrics

Transfers were for a wide variety of problems, usually because the child required sedation and intubation. There was no obvious advantage to videoconferencing in these cases.

We also discussed with the HGH stroke physicians and cardiologists whether the management of patients they admitted to HGH could be improved by videoconferencing from the ED. There are clear ambulance protocols for stroke and chest pain which lead to most patients with a short history of stroke or myocardial infarction being taken straight to Oxford for emergency intervention. There are clear protocols for managing patients who are seen in HGH ED. Very occasionally there will be an unusual presentation of stroke but this can usually be managed with phone advice from Oxford.

Logistical problems

Communication of clinical information needs to be secure and confidential. There is broadband communication between HGH and Oxford based hospitals which can be used for video conferencing. At present we do not have the ability to extend this to clinicians outside the hospital (ie at home). If we implemented video conferencing with a specialist team in Oxford where the senior team members go home at night, it is only likely to be effective (i.e. involve a senior experienced member of the team) during the day (possibly 0800-2200hr). We analysed all 413 transfers to Oxford over 6 months. Only 46% (193) had a condition where video-conferencing or photography might have helped management. 136 of these patients were seen between 0800 and 2200hr and could potentially have benefited. This is equivalent to only 5 patients per week across the range of specialities cited previously. There are approximately 12 middle grade doctors employed in HGH ED between 0800 and 2200hr per week so over the course of 6 months each doctor would see 13 patients (1 every other

week) in whom video conferencing/imaging might support specialist advice from Oxford. It seems unlikely that they would think to use it with so few cases per doctor. The specialist team in Oxford could ask for video conferencing but again it would be only an occasional use for each individual within the specialist team. Unless an intervention is used on a regular basis by the individuals involved, with some tangible benefit to its use, it seems unlikely that it would be used at all.
There is also a concern over retention of video conferencing devices. It would be very easy for individuals to walk out of the department with a tablet device, iPad or iPod and it seems likely that they would need to be replaced on a regular basis.

Expected Impact
This study has shown that, in a well run DGH ED with regular links to a tertiary centre, the common presentations which require specialist advice can be managed with the use of protocols, supplemented by radiology image transmission (PACS) and that, contrary to expectation, a specialist history and /or patient imaging is rarely critical in deciding on management. Redesigning patient pathways from home so that the ambulance goes direct to a major centre with certain categories of patients, has also had a major impact in delivering the patient to the appropriate place for assessment and treatment.

Conclusions
We have collected detailed information on the patients transferred from a DGH ED to a specialist centre and admitted locally over 6 months. We have used that data to explore the potential use of videoconferencing with the specialists and local clinicians involved and shown that use of video-conferencing between patient and specialist is unlikely to be helpful when used for the common presentations in a DGH ED.

Patient and public involvement

There was no patient or public involvement in the study as the planned involvement would have been in the second part of the study.

Data sharing statement
See link
[https://www.nihr.ac.uk/documents/nihr-position-on-the-sharing-of-research-data/12253] for the NIHR position of the sharing of research data. The NIHR strongly supports the sharing of data in the most appropriate way, to help deliver research that maximises benefits to patients and the wider public, the health and care system and which contributes to economic growth in the UK. All requests for data should be directed to the award holder and managed by the award holder.

Disclaimer
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This project was carried out between October 2011 and December 2012. This final report has not been peer-reviewed. The report was examined by the Programme Director at the time of submission to assess completeness against the stated aims.