Telemedicine – Bringing specialist care to remote areas

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Abstract

In 2006 Queensland Health trialed telemedicine (the remote delivery of healthcare services over the telecommunications infrastructure) for 6 months to aid the assessment and management of patients presenting to Palm Island Hospital. This was done by Emergency Physicians expert in aeromedical retrieval work from The Townsville Hospital. There was a demonstrated improvement in patient care which coupled with the increasing reliance on junior medical staff working in small peripheral hospitals prompted a statewide rollout of emergency telehealth. Emergency telemedicine is now considered by many as 'best practice' with high rates of satisfaction and improvement in patient care.

The unprecedented growth in employment provided by the mining industry means there is a rapidly expanding workforce working in increasingly isolated areas with limited access to experienced medical care. Emergency Telehealth is a cost effective, potentially life saving solution to remote medical care.

Two cases are discussed which highlight the beneficial effect upon patient care provided by specialist driven telemedicine.

The Problem

In Australia it is estimated that there are approximately 210,000 people working in the mining industry (Reference) and that there are 62,000 people working in mining in Queensland. The majority of this workforce work in remote parts of Queensland with limited access to high level medical care. These individuals make up approximately 2% of the workforce of Australia.

Over the next ten years it has been estimated that there will be a requirement for an additional 40,000 workers in Queensland alone driven by an anticipated extra $42 billion (AUD) in capital expenditure (Bell 2012).

To put these numbers into perspective when considering equity of healthcare this equates to a population larger than that of Townsville and its immediate surrounding areas working with a competent but not medically trained workforce. Clearly the provision of high quality medical care when dealing with a fragmented population working often in extremely isolated environments is problematic. It would be impractical and very expensive to provide on site medical officers to all remote mining sites. This problem is also compounded by the increasing reliance of good but inexperienced doctors working in regional healthcare centres and organizations such as the Royal Flying Doctor Service (RFDS) are already stretched meaning that there are often significant delays to emergency medical care.

How can we improve the efficiency and equity of access to healthcare for this population ?

Queensland Health Model

Prior to 2004 there was no central oversight over patient retrievals and transfers throughout Queensland.clinical coordination (the provision of medical advice and subsequent retrieval of patient to an appropriate health facility) had evolved due to the increasing number of critically unwell patients in Queensland coupled with an expanding aeromedical resource base (by 2004 Far North Queensland had rescue helicopters based in Cairns and Townsville with RFDS aeroplanes in Mount Isa, Cairns and Townsville). A centralized model of aeromedical coordination was implemented with Brisbane looking after the southern half of the state and Townsville looking after the north. The Northern Zone was run by Emergency Physicians out of The Townsville Hospital covering 750,000 sq km with a population of 600,000 people. Patient movement increased substantially over the subsequent years so that by 2010 there were approximately 20,000 patients movements coordinated throughout Queensland. (Reference)

In 2006 a pilot study of telemedicine was trialed. This was done between The Townsville Hospital and Palm Island Hospital and aimed to evaluate whether introducing video assisted consultation between medical staff from Palm

Island and Emergency Physicians in Townsville (the receiving doctor) would improve patient care. The trial also wanted to assess whether such a service could also reduce the number of unnecessary retrievals, night flights deemed as being particularly hazardous. (Matthews et al 2008)

At the end of the trial period a total of 113 patients had been referred for transfer and telemedicine had been used for 44 (39%). The relatively low use of the telemedicine link was attributed to a high proportion of obstetric retrievals (and therefore deemed inappropriate) or the referring or receiving doctor being too busy. The results of the trial revealed that subjectively both coordinators and referrers felt that telemedicine had improved care (75% and 65%), that the equipment was easy to use and that its use prevented ten aeromedical flights (six of these at night).

Following the success of this initial trial there was a statewide rollout of telemedicine in late 2008. As of March 2012 there are 108 telemedicine sites located in peripheral healthcare facilities across Queensland supported by telemedicine hubs in both Townsville and Brisbane.

Can this model of healthcare delivery be applied to the mining industry ?

Telemedicine History

The World Health Organisation defines telemedicine as “the use in consultation of medical knowledge via communication networks when disease is a determining factor.” Historically the term telemedicine has been used to incorporate the medical use of telephonic, facsimile and only more recently video consultation. The term is however increasingly been used for remote collaborative real time patient management delivered at a distance using interactive video. The use of this has been increasing with improvements in technological infrastructure and the increasing ability to easily transfer large amounts of data quickly using an internet protocol based model (Skype and Facetime are two examples of such a platform). Telemedicine has massive potential in Queensland due to its vast geography. The delivery of healthcare to industries with potential for significant medical and traumatic injury working in remote areas would appear to fit logically with this model of care.

Something about the first ever telemedicine consults and progress

Advantages of Telemedicine

Provision of telemedicine can provide efficient and effective healthcare as well as ensuring that it is also provided equitably. It is intuitive and has long been established that the facilitation of timely healthcare in critical illness improves mortality (risk of death) as well as reducing unnecessary complications. From the study in Townsville it would appear that unnecessary transfer of patients from remote sites to tertiary level city based care can also be avoided hereby producing economic benefits to both patient and organization. Telemedicine

provides emergency specialist medical advice to non specialist care providers in remote locations. Long term this is likely to provide an educated more confident workforce capable of dealing with increasingly complex acute medical problems. What is less easier to quantify is the psychological support that telemedicine can provide to remote caregivers, safe in the knowledge that they are not alone in managing often complex and challenging medical problems, emergency medical help just a video link away.

There have been many trials into telemedicine but the benefits are very difficult to measure due to a lack of large scale, methodologically robust trials. Anecdotally telemedicine appears to provide an improved quality of care. A cost benefit is yet to be established however again it is estimated that the potential in cost savings to Australia is in the region of $2 - $4 billion (AUD) per annum (Cost economics NBN site).

Disadvantages of Telemedicine

The most obvious problem with a web based medical consultation service arises from the reduced ability for remote a remote physician to perform physical examination and an inability to perform skilled tasks. The inability to auscultate (listen) to a patients chest or examine eyes, ears or throat is a hindrance to accurate assessment. Various gadgets (Eg iexamine – an iphone accessory from which visualization of the fundus of the eye) would seem to help but examination is still restricted.

Some concerns exist with regards to patient confidentiality and potential breaches of security for commercially available web based platforms however this is largely unfounded as most software uses 128 – bit encryption which give a high level of data protection whilst still affording high resolution and streamed video (higher levels of encryption reduce this ability).

There is the potential for increased healthcare costs and whilst there is insufficient data to support this specialist doctors are expensive and better access may theoretically promote excess usage. Start up costs are minimal however as access to high speed broadband is relatively cheap as is the hardware to drive telemedicine.

Can we morally, ethically or legally put a price on an employee’s health ?

Emergency Medicine

Emergency medicine is a young speciality effectively commencing in the 1960’s following the realization that in severely unwell patients, earlier more appropriate interventions lead to markedly improved outcomes in terms of preventing death and serious disability.

Emergency medicine has evolved so that now there is an expectation that emergency physicians are competent in treating a wide range of illnesses and

conditions both acute and chronic, from being experts in resuscitation (critical care), treating heart attacks (cardiology), managing airways (anaesthesia), fixing wounds (plastic surgery), setting fractures (orthopaedics) as well as interpreting Xrays and pathology tests. Emergency physicians are the “jack of all trades” of the medical world but also masters of the critically unwell.

Emergency Telemedicine and The Mining Industry

It appears that the mining industry and emergency telemedicine are a good fit. Emergency healthcare is complex and there is an increasing need for correct and expedient treatment decisions in critical illness if patients are to avoid harm. Couple this with the distance factor where definitive care is often many hours away.

Case 1

You are looking after a patient on a remote mine site who presents to your medical centre with chest pain with definitive care several hours away. An electrocardiogram (ECG) has revealed that the patient is suffering an acute heart attack. There is inclement weather and RFDS are unavailable. How would you and your organization manage this situation where reperfusion (clot busting) treatment is some time away? This is just one example of a case where emergency physician driven management via telemedicine can have a real and very significant effect on short and long term outcomes and save life.

Now imagine that patient with chest pain is yourself. How would you want to be managed ??

Case 2

A 25 year old male presents to your medical centre following an injury to his shoulder on site. He has a previous history of dislocating the same shoulder and the paramedic on site correctly diagnoses an anterior dislocation. The paramedic organizes a QAS transfer to the nearest local Queensland Health facility (a two hour round trip) where the junior medical officer on duty is reluctant to attempt relocation on their own and so organizes an RFDS transfer of the patient to tertiary level care. The patient arrives at the major hospital the following day where his shoulder is relocated.

Alternatively a telemedicine consult is performed on site and under direct supervision the paramedic is instructed in the use of the ‘Cunningham’ technique to reduce the shoulder without analgesia or sedation. Following reduction a non urgent commercial transfer of the patient is organized for routine orthopaedic care.

The Future

The Federal Government is currently in the process of rolling out the well publicised National Broadband Network. This new high speed broadband network will have the ability to provide users with access to ultra high speed internet. It is anticipated that this rollout will revolutionise delivery of healthcare to remote areas with an estimated 500,000 telemedicine consultations delivered regionally by 2015. (Access Economics)

It is an expectation of the author that telemedicine will rapidly become a standard of care for the mining industry.

Conflict of Interest.

The author is the director of Axonal which specializes in providing education and medical consultation including telemedicine to regional areas.

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