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REVIEW

Telerheumatology: an idea whose time has come

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Key words

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Abstract

Australia is a vast country with one-third of the population living outside capital cities. Providing specialist rheumatologist services to regional, rural and remote Australians has generally required expensive and time-consuming travel for the patient and/or specialist. As a result, access to specialist care for remote Australians is poor. Rheumatoid arthritis is a common disease, but like many rheumatic diseases, it is complex to treat. Time-dependent joint damage and disability occur unless best evidence care is implemented. The relatively poor access to rheumatologist care allotted to nonmetropolitan Australians therefore represents a significant cause of potentially preventable disability in Australia. Telehealth has the potential to improve access to specialist rheumatologists for patients with rheumatoid arthritis and other rheumatic diseases, thereby decreasing the burden of disability caused by these diseases. Advances in videoconferencing technology, the national broadband rollout and recent Federal government financial incentives have led to a heightened interest in exploring the use of this technology in Australian rheumatology practice. This review summarises the current evidence base, outlines telehealth's strengths and weaknesses in managing rheumatic disease, and discusses the technological, medicolegal and financial aspects of this model of care. A mixed model offering both face-to-face and virtual consultations appears to be the best option, as it can overcome the barriers to accessing care posed by distance while also mitigating the risks of virtual consultation.

Introduction – Why telerheumatology?

One-third of the Australian population living outside our capital cities do so at one of the lowest population densities in the world.¹ In contrast, only 13% of our specialist rheumatologist workforce lives outside capital cities.² The national rheumatologist workforce shortage further

exacerbates the workforce maldistribution for this population.³ Substantial travel costs and travel time bedevil the lives of nonmetropolitan patients with rheumatic disease who require specialist input for optimal care. Time and financial costs may pose significant barriers in accessing specialist care, such that the amount of care may be reduced or be entirely absent.^{4,5}

While travel time and costs constrain health equity in Australia, the problem attains national public health significance for people with rheumatoid arthritis (RA).

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This common disease, with 1% prevalence, causes time-dependent destructive arthritis and disability in the majority of sufferers.⁶ There is now the highest level of evidence that treatment within 6 weeks with disease-modifying antirheumatic drugs (DMARDs), with escalation until remission is achieved, prevents most of this disability.⁷ Delaying DMARD treatment initiation by even a few months can result in the accrual of additional damage and makes remission more difficult to achieve. That people with new-onset RA are regularly waiting up to 2 years in some parts of Australia before seeing a rheumatologist⁸ and starting DMARD treatment provides a powerful motivation to look for solutions.

Telehealth offers a new model of care that may reduce the barrier in accessing care imposed by travel time and costs. Recent improvements in videoconferencing technology, combined with enthusiastic government support for the model, have led to substantial interest from clinician groups. Already telehealth is delivering on its promise in a number of Australian settings including aged care,⁹ oncology¹⁰ and retrieval medicine.¹¹ In clinical settings where specialist physical examination skills may be needed, additional considerations arise. Furthermore, medicolegal, policy and procedural standards are rapidly being developed and fine-tuned to address the new issues raised by telehealth's implementation. The remainder of this article addresses these considerations in the application of telehealth to Australian rheumatology practice.

Benefits

Improved access to care

One of the obvious benefits of establishing a telerheumatology service is increased access to care for a population that might otherwise receive delayed and therefore substandard treatment. A recent report by the Australian Rheumatology Association found a severe shortage of rheumatologists in Queensland that will only become worse in the near future as practitioners retire and an inadequate number of replacements is trained.³ This report also indicated that greater than 50% of patients are seen outside the recommended 6-week waiting time for initial consultation. For disease entities such as RA, where the success of treatment and the prevention of long-term disability are time-dependent, the delays mean that these patients are receiving substandard care relative to the urban population and face an increased risk of lifelong disability. Telehealth consultations have the potential to allow patients to be seen by a specialist sooner, to be diagnosed sooner and to start treatment sooner, resulting in better long-term outcomes. These consultations may also be an important and significant

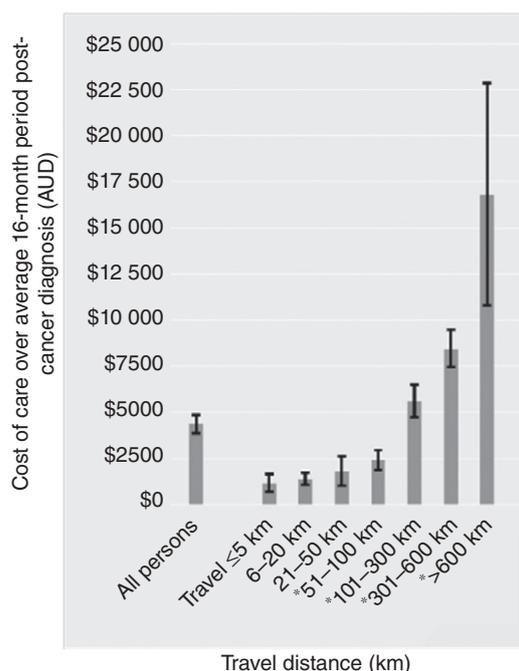


Figure 1 Relationship between travel distance to specialist and the cost investment for the patient (mean net costs by subgroups with 95% confidence intervals). * indicates statistical significance. Adapted from Gordon *et al.*¹²

step towards ameliorating the current disparity between the availability of care for rural and urban patient populations.

Saving time and money

Telerheumatology may have considerable financial implications for both practitioners and patients. For patients who are remote from major metropolitan centres, where the majority of specialists are located, consultations can be associated with significant cost both in time lost from work and for the travel involved. As patient distance from the consultant increases, for each visit, there are escalating costs and time investment for the patient (Fig. 1). A study by the Cancer Council of Queensland found that patients reported higher personal costs if they lived more than 100 km from the tertiary centre Townsville.¹² Considering that many rheumatic disorders are chronic, complex conditions requiring ongoing visits with a specialist, the accumulated long-term personal costs can be substantial.

Increased efficiency for individual consultants may also come through substituting teleconferencing for face-to-face visits in already established outreach clinics where consultants may be travelling great distances to provide care for remote populations.⁵ Telerheumatology has the

potential to allow consultants to schedule and see patients virtually in real time in the same manner as they would see patients face to face in a clinic setting.¹³ Depending on the modality used for the videoconferencing setup, studies have demonstrated that the system generally becomes rapidly cost-effective if a sufficient number of patients is seen.^{14,15} Another potential benefit is the ability to see sicker patients and patients with treatment related complications from rural hospitals urgently.¹⁶ There is some evidence that if treatment is initiated locally, it may reduce the need for costly inter-hospital transfers.¹⁷ Finally, the government has recognised telehealth's potential; financial support, including Medicare repayments, are available for physicians who see patients virtually.¹⁸

Improved communication

The benefits of telerheumatology may go beyond merely decreasing the time to treatment and reducing the financial burden of care for people from remote areas; it may also improve communication between the referring physician, consultant and patient.^{4,5,13,19,20} Additionally, general practitioners (GPs) often find that sitting in on the consultations provides an excellent learning opportunity and in some cases allows them to manage personally some future cases without needing to refer the patient.^{21,22} Patients and the referring physicians have also indicated that they preferred the immediate feedback allowed by the teleconsultation compared with the traditional method of referral.⁵ These benefits may be seen

across different cultures; Aboriginal Australian health workers have described benefits from videoconferencing and teleoncology not only for patients and their families but also in adding educational value for themselves and in fostering closer working relationships with the specialist team.²³

Challenges

Assuring quality of care

An expert consensus informed by evidence is needed to establish which diseases and clinical settings will be most appropriately managed through telehealth and what local support is necessary for the consultation in various scenarios. A draft guide has been suggested by the authors (Table 1). In some instances, teleconferencing may be inappropriate, while in others, the presence of a medical practitioner may be redundant and a direct consultation between the specialist and patient might be adequate. A potential concern regarding quality of care is the accuracy of rheumatic diagnoses made through videoconferencing. Reassuringly, in other fields, videoconferencing has been found to be a 'reliable' method of diagnosis,^{19,24} and several studies indicate that, in general, telerheumatology is reasonably accurate for rheumatic diseases when compared with the gold standard of face-to-face consultation.^{4,13} However, further research will be needed before this question is wholly established.

Table 1 Clinical applications of telerheumatology. Author recommendations regarding the appropriateness of telehealth consultations for various rheumatic diseases and the participants necessary for each interaction.

Clinical scenario	Relevant diseases	P	GP+P	MSK+P
Complex disease monitoring not requiring examination	Inflammatory arthritis (in remission), chronic gout, fibromyalgia	+	+	+
Feedback following test results	Any	+	+	+
Complex disease patient education and management plan	Any	+	+	+
Unplanned acute change in disease state	Flare of known disease	+/-	+	+
Diagnosis of clear-cut presentation of complex disease	Severe RA with CCP+, gout with positive joint fluid, OA, fibromyalgia,	-	+/-	+
New referral that may not require face-to-face consultation	Positive serological tests without clinical features (RA, SLE)	-	+	-
Screening prior to face-to-face consultation to ensure appropriate investigations done or redirect misdirected referral	Any	-	+	-
Complex disease monitoring requiring MSK examination	Active inflammatory arthritis	-	-	+
Ongoing prescription of specialist only medications (e.g. biologics)	RA, PsA, AS	-	-	+
New complex patient requiring rheumatologist examination (e.g. SLE, vasculitis)	SLE, vasculitis, undifferentiated regional pain presentations	-	-	-
Failed attempt at telerheumatology		-	-	-

AS, ankylosing spondylitis; CCP, cyclic citrullinated peptide; GP, general practitioner; MSK, clinician competent in inflammatory musculoskeletal examination; OA, osteoarthritis; P, patient; PsA, psoriatic arthritis; RA, rheumatoid arthritis; SLE, systemic lupus erythematosus.

Patient satisfaction

A large-scale adoption of virtual rheumatologist–patient consultations will presumably force our understanding of this interaction to evolve. It is self-evident that rapport between patient and physician is a critical aspect of the care the patient receives and can impact on patient compliance. The physical barriers of distance and technology may affect the relationship the patient has with the physician, and his or her perception of the care received. There has been some criticism of the current body of literature relating to patient satisfaction in telehealth with regards to methodology and generalisability.^{25,26} However, at least one study that looked at patient satisfaction with telerheumatology found that the vast majority (90%) were satisfied with their interaction after televisual consultation.¹³ In contrast, 97% of patients were satisfied with their face-to-face consultation with the same doctor suggesting that at least some of the 10% who were not satisfied with the teleconsultation may have been dissatisfied with the medium of the interaction rather than with the specialist. One model that may help address these concerns may be to schedule intermittent face-to-face consultations to supplement teleconferencing. For example, to reduce wait time to diagnosis and treatment, initial consultations may be organised through telehealth with a plan for future face-to-face consultations to cement the patient–doctor relationship. Alternatively, initial consultations might be face-to-face with the review appointments virtual. This would still have the effect of improving access to care and reducing overall costs associated with treatment by decreasing the number of times that the patient is required to travel for treatment.

Financial considerations

On 1 July 2011, the Australian Federal Government introduced new Medicare Benefits Schedule (MBS) telehealth incentives.¹⁸ These incentives will help with the cost associated with adopting this new technology, recognising that many aspects of clinical practice will need to

Table 2 Telehealth incentives. Details of Medicare Benefits Schedule (MBS) funded ‘on-board’ incentives to medical practitioners for incorporating telehealth in their practice. Adapted from MBS Online website¹⁸

Incentive	2012–2013	2013–2014	2014 onward
First telehealth on-board instalment	\$1600	\$1300	\$0
Second telehealth on-board instalment	\$3200	\$2600	\$0
Total on-board incentive	\$4800	\$3900	\$0
Telehealth service incentive	\$48	\$39	\$0
Bulk bill incentive	\$16	\$13	\$0

The bold row “Total on-board incentive” is the sum of the first two rows, namely “First telehealth on-board instalment” and “Second telehealth on-board instalment” in each column.

be adjusted including billing, scheduling, staff training and information technology requirements.²⁷ The initial financial outlay is variable depending on the technology used. Among the authors, some have found Skype (Microsoft Corp., Redmond, WA, USA) adequate, while others have chosen to purchase more costly technology. A rheumatologist who reviews a patient by telehealth is paid the relevant specialist attendance item (e.g. Items 110, 132, 116 or 133) plus the new telehealth item 112. The ‘derived fee’ for the 112 is 50% of the Medicare fee for the attendance item (Table 3). In addition, there are currently three types of incentive payments made by Medicare. The one-off ‘on board incentive’ is paid in two instalments. The 1st is paid after the first telehealth item is claimed; the 2nd is paid after 10 valid telehealth services are provided (Table 2). This incentive reduces annually. The telehealth service incentive is automatically accrued with each 112 billed; it is paid quarterly by Medicare. This incentive also reduces each year (Table 3). All practitioners are encouraged to bulk bill by the bulk billing incentive, which automatically accrues each time the telehealth consultation is bulk billed (Table 3).¹⁸ The recent Federal budget announced all telehealth incentives will end 1 July 2014.²⁸ As the value of the incentives reduce, it is possible that the number of patients who will receive an account from the specialist to cover the gap will increase.

Table 3 Fees derived from services provided to patients through telehealth. Current Medicare Benefits Schedule (MBS) fees for rheumatologist’s provision of patient care through telehealth including the fee, derived fee, service incentive and bulk billing incentive. Adapted from MBS Online website¹⁸

MBS Item	Fee	Derived fee for 112	THSI	THBBI	Total 2012–2013	Total 2013–2014	Post 2014
110	\$125.90	\$62.95	\$48	\$16	\$252.85	\$240.85	\$188.85
116	\$63	\$31.50	\$48	\$16	\$158.50	\$146.50	\$94.50
132	\$220.15	\$100†	\$48	\$16	\$394.15	\$382.15	\$330.15
133	\$110.25	\$55.10	\$48	\$16	\$229.35	\$217.35	\$165.35

†There is currently a cap of \$100 for item 112. THBBI, Telehealth Bulk billing Incentive; THSI, Telehealth Service Incentive. The bold column titled “Total” is the sum by row of the first four columns: “Fee” + “Derived fee for 112” + “THSI” + “THBBI” = Total (in each row).

Medicolegal considerations

The Department of Health and Ageing reports that it has 'received advice that indemnity premiums will currently not be affected by the performance of video consultations' but that insurers will keep track of the level of consultations performed.²⁷ All practitioners are expected to practise in accordance with The Medical Board of Australia Guidelines on technology-based patient consultations.²⁹ These guidelines note that making a 'judgement about the appropriateness of a technology-based patient consultation and, in particular, whether a direct physical examination is necessary' is the responsibility of the practitioner. While it is anticipated that all indemnity providers will afford protection for video consultation, at least one insurer, Medical Indemnity Protection Society, has suggested that they will also expect the specialist to perform face-to-face consultations with patients.³⁰ They do not specify when in the course of treatment, this should occur only, that telehealth should be supplemented with in-person consultations. As telehealth is an evolving field, it is recommended that individuals who are offering telehealth inform their own indemnity provider of its use of and have their policy amended to state this. As with all medical care, it is vital that the responsibility for patient follow up and ongoing management is clarified between the specialist and GP for all telehealth consultations.³⁰

Technological considerations

Telehealth represents a new way of practising for rheumatologists, and some may perceive that technology is a barrier. There is already a range of technologies available to support videoconferencing. Many online companies in Australia promote different hardware and software solutions, as well as ways to connect interested GPs with interested specialists – googling 'Telehealth' (24/7/12) found that the top six links were to different companies providing these services. The specific technical requirements are not currently mandated and will vary from specialty to specialty. For example, an ophthalmology service might be enhanced by a modified direct ophthalmoscope. A dermatology service might be similarly helped by the use of a video dermatoscope. Telerheumatology requirements are simpler, and dedicated, high-end systems may not be required. In many cases, the technology is already in place at both GP and specialist ends: a fast and stable broadband connection and a computer with either a built-in webcam or a good quality peripheral webcam connected through USB. Sound quality can be improved simply by a headset with an attached microphone. On the software side, freeware such as Skype, iChat (Apple Inc., Cupertino, CA, USA) or FaceTime

(Apple Inc.) are in widespread use to keep in touch with friends and family. Skype already appears to be widely used in telehealth.³¹ There are many other low-cost software solutions (examples include WebEx by Cisco (San Jose, CA, USA) or LifeSize by Logitech (Romanel-sur-Morges, Switzerland)). Rheumatologists utilising telehealth may end up using a variety of software dependent on the different software adopted by referring GPs. The MBS Online website³² suggests that clinicians providing MBS billed telehealth services should be confident that the technological solution they choose is capable of providing sufficient video quality for the clinical service provided and that it is sufficiently secure to ensure the normal privacy requirements for health information. At this stage, no specific software solution has been recommended.

Clinician and staff support

One important component for the successful adoption of a telehealth service is the presence of an enthusiastic advocate.^{4,19} This is particularly important when obstacles (financial, technological or managerial) appear and the temptation to abandon the project in favour of more traditional consultations is great. As with any new enterprise, preparation is crucial. It is important to ensure that there is adequate support staff and that all individuals involved are properly trained in their roles. This training should include information about the new technology, the different duties that will be required for efficiently running the consultations and how to access the appropriate assistance when needed. The better the preparation, the more efficiently the clinics are likely to run once started. One problem that was encountered in previous clinics was the difficulty in managing the conflicting schedules of the GPs and specialists when trying to schedule joint teleconsultations.³³ One recommendation for trying to streamline this process was to make doctors' calendars available online to staff at the various locations to make coordinating appointments easier.³³

Conclusion

Telehealth is a new and exciting frontier in medicine with great potential benefits for individuals living in remote areas including improved access to care, improved efficiency and affordability of treatment, and better communication between patients, GPs and specialists. Rheumatology patients stand to benefit from earlier diagnosis and treatment, which can prevent long-term disability. There are barriers to implementation, such as cost, training and technology requirements, as well as potential complications, including the need to clarify how teleconsultations will be handled by

insurers. It is important that teleconsultations are supported by the option of face-to-face consultations to ensure that telehealth's deficiencies can be addressed in specific situations. The potential benefits are consider-

able, and with enthusiastic advocates and well-trained support staff, telerheumatology may prove to be an effective tool for managing patients who would otherwise receive substandard treatment.

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ORIGINAL ARTICLE

Meta-analysis of amiodarone versus beta-blocker as a prophylactic therapy against atrial fibrillation following cardiac surgery

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Abstract

Background: Current guidelines recommend beta-blocker as the first-line preventive treatment of atrial fibrillation (AF) after cardiac surgery; if beta-blocker therapy is contraindicated, then amiodarone is recommended. There is still lack of strong evidence of directly comparing the efficacy of amiodarone and beta-blocker in preventing post-operative AF (POAF).

Aim: This meta-analysis was to determine whether amiodarone and beta-blocker are equally effective and safe, or one is superior in preventing POAF.

Methods: We searched the Medline, Web of Science, Cochrane Library databases and clinical trial databases for related articles published from January 1990 to October 2011. The primary outcome was development of AF after cardiac surgery. We used random-effects model when there was significant heterogeneity between trials and fixed-effects method when heterogeneity was negligible. Moreover, subgroup and sensitivity analyses were also performed.

Results: We identified totally six trials, which involved 1033 patients. The amiodarone group did not significantly differ from the beta-blocker group in AF occurrence (risk ratio 0.77, 95% confidence interval 0.55 to 1.06, $P = 0.11$) or the length of hospital stay (weighted mean difference -0.05 day, 95% confidence interval -0.64 to 0.54 , $P = 0.86$). Subgroup analysis stratified by different beta-blockers revealed that amiodarone significantly improved POAF as compared with propranolol. In addition, there was no difference in adverse events after operation.

Conclusion: These data indicate that the occurrence of AF and length of hospital stay after surgery are similar in the amiodarone and beta-blocker groups.

Introduction

Atrial fibrillation (AF), one of the most common complications following cardiac surgery, may result in increased

postoperative morbidity and mortality.^{1–3} Furthermore, AF after cardiac surgery results in prolonged hospitalisation after the procedure as well as an excess utilisation of hospital resources and increased hospital costs.^{4,5} Given the importance of AF for patient outcome, a wide variety of prophylactic pharmacologic strategies^{6–8} has been evaluated. All identified meta-analyses and trials

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