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Experiences with a pilot electronic skin multidisciplinary clinic for complex skin cancer

Abstract

Introduction: Complex skin cancers (CSCs) may benefit from review by a specialist skin multidisciplinary team (MDT). Accessing an MDT may be difficult for practitioners in non-metropolitan settings. Technology has been promoted as a solution. We decided to pilot an electronic or virtual skin MDT (eMDT).

Methods: To gauge the level of need for a skin cancer MDT, a survey was circulated at a rural general practitioners (GPs) conference. Previous non-metropolitan referrers of skin cancer patients to our centres were also contacted to acertain the level of need, and a search was conducted for other non-metropolitan doctors who may be interested.

For the skin cancer cases that were discussed at the eMDT, patient characteristics' data was collected and included sex, age, distance from the patient's home to our hospital, referral information, whether the patient was immuno-suppressed, whether the diagnosis involved a true CSC, what the referrer's question was for the MDT, and whether a decision was made to advise the referring clinician of the MDT specialist team's recommendations.

Results: Five rural general practitioners (GPs) who responded to a survey, 10 previous referrers and 5 other rural GPs unanimously supported the need for a skin eMDT service. The surveys revealed that on average patients waited five months and travelled approximately 140 kilometres (km) to access specialist treatment. Four out of five (80%) of the survey respondents did not have an established referral pathway for CSC cases.

Seven eMDT meetings were held fortnightly over 13 weeks. A total of 19 patients were presented. Of these, two patients were presented twice. Eighteen of the 19 patients were referred directly from members of the eMDT specialist team with radiation oncologists (ROs) accounting for most of the referrals (11/19). Only one referral came from a rurally based GP. The average age of the 19 patients was 69 years (range: 33-62 years), and 12 patients were males. The average distance from the patients' home to our hospital was 75 kilometres. Six patients had an ECOG performance status of one or more. Five were immunocompromised, and all were reasonable cases to present. Eighteen patients had clear documented treatment decisions made by the eMDT with most decisions being for either adjuvant or definitive radiotherapy.

Discussion: The structure and function of the eMDT is detailed along with the involvement of regional GPs. There could have been some bias observed because the number of ROs who participated outweighed that of other specialists. The eMDT was phased out for several reasons. It failed to serve the target referrer and patient population; process and documentation were poor; and there were issues with perceived competition from within and outside our health area. The arrival of the Covid-19 pandemic meant that our hospital's main skin MDT became a virtual meeting, and the eMDT was therefore amalgamated into this service.

Keywords: skin cancer, experiences, pilot study, electronic, virtual, multidisciplinary clinic, telemedicine, complex skin cancer

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Introduction

Australia has a high incidence of skin cancer that is increasing.[1] Some skin cancers progress to be 'complex skin cancers' (CSCs). CSCs could be described as those requiring an opinion from multiple disciplines; that is, a surgeon for excision, a radiation oncologist for radiotherapy, a dermatologist for topical therapy (Table 1), or a combination of treatment modalities.

Patients suffering from these cancers may benefit from input from a skin multidisciplinary team (MDT). MDTs are common in other cancers, e.g., breast,[2] prostate,[3] colorectal,[4] and head and neck cancer,[5] and have led to better outcomes. MDTs also help to increase clinical trial accrual.[6] Skin specific MDTs[7] may be particularly beneficial given the emergence of newer and better treatments for CSCs such as Mohs surgery,[8] modern radiotherapy (RT),[9] and targeted and immune-based systemic therapies prescribed by medical oncologists.[10]

The acute hospital setting, where MDT colleagues walk the same corridors, has aided the development of MDTs. Skin cancer MDTs, especially for non-melanoma skin cancer (NMSC), are, however, not that common, even in Australia. CSCs are often managed through head and neck MDTs in metropolitan tertiary hospitals, which are mainly for cancers of mucosal origin. The literature on skin cancer MDTs is not as developed as it is for other cancers despite the frequency of skin cancer. Perhaps this is because skin is traditionally looked after in the community rather than through a hospital. Those who look after skin cancer may lack access to an appropriate MDT even though skin MDTs have been called for.[11] Access may also be particularly difficult for clinicians in rural and remote settings.[12] Patients, especially those with a lower socio-economic status or those who live a considerable distance from a metropolitan area, may develop more complex disease due to the difficulty and delay in accessing specialist opinions and appropriate therapy.

Table 1 Complex skin cancers (CSCs)

Characteristics	Description of Characteristic
Patient	• Immuno suppressive disease, e.g., HIV
	• Transplant recipient
	• Haematological malignancy e.g., CLL
	• On immunosuppressive drugs, e.g., long term steroids
	• Co-morbidities precluding standard therapy, e.g., significant anticoagulation precluding surgery, vascular insufficiency
	• Patient declines a standard therapy, e.g., a surgical technique that has significant functional and cosmetic impact
Tumour	
	Cutaneous melanoma:
	• Melanoma-in-situ/lentigo maligna/hutchinsons melanotic freckle that is borderline resectable
	• Primary melanoma that is 1mm or greater in depth, or 0.8mm with ulceration that may require sentinel lymph node biopsy
	• Metastatic melanoma to regional lymph nodes and beyond
	Keratinocyte cancers (BCC, SCC):
	• Borderline resectable; resection having a bearing on future function and cosmesis
	• High risk features following resection, e.g., positive margin, lymph vascular space invasion, perineural invasion or nerves over 0.1 mm in diameter, over 4mm thick
	• Local recurrence
	• Metastatic to regional lymph nodes and beyond.
	• Extensive skin field cancerisation
	Rare cutaneous cancers:
	• Merkel cell carcinoma
	• Cutaneous T-cell lymphoma
	• Kaposi's sarcoma
	• Sebaceous gland carcinoma
	• Dermatofibrosarcoma protuberans
	• Benign – recalcitrant keloids, etc
Treatment	• Trial patient where a trial is only offered at a certain location, e.g., metropolitan
	• Investigation or treatment only available at a certain location, e.g., metropolitan

Abbreviations: CLL; chronic lymphocytic leukemia, HIV; human immunodeficiency virus

Technology has been promoted as a solution.[13] A literature review[14] found that telemedicine resulted in increased levels of medical competence and improved provisions of diagnosis, treatment, and follow-up of patients irrespective of location. Another literature review[15] showed that two decades of teledermatology have reduced travel, wait times and unnecessary dermatologic visits, and also improved access of care to underserved patients. Finally, a Canadian group[16] also used telemedicine to conduct a dermatology-based randomised controlled trial (RCT).

We decided to pilot an electronic or virtual skin MDT (eMDT) for CSCs aimed at regional patients to assess its utility. The structure, function and measures of success are detailed in the discussion.

Methods

This project was planned to be a research project with ethics approval and research resources assumed.

1. Establishing the need for a skin eMDT

a. Rural general practitioner's (GP) survey

Initially, we wanted to establish whether there was a need for an eMDT. In December 2019, the Rural Doctors Network and Rural Doctors Association of New South Wales (NSW) held a rural GP conference in Manly, Sydney. We hosted a booth at the conference and distributed surveys about skin MDTs to understand the level of interest of participating doctors.

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b. Asking previous non-metropolitan referrers

We analysed our records and contacted other NSW GPs in remote and rural areas who had previously referred to our service for any reason. We also contacted GPs who had been involved in the care of patients with CSCs that we had treated as we particularly wanted to hear their opinion on the need to establish a skin eMDT.

c. Contacting potentially interested non-metropolitan GPs

We assumed that rural areas with a radiation oncology (RO) service would have a skin MDT or, at the very least, an established referral pathway for CSCs. Therefore, we carried out an internet search for rural GPs in rural NSW locations without an RO facility and found the names and addresses of those advertising an interest in skin. Towns such as Lithgow, Bega, Goulburn and Dubbo were examples. We collated lists, rang each practice and tried to speak to the GPs with a skin interest.

2. eMDT data collection

We prospectively planned to collect patient oncological outcome data at one year as well as data on functionality and cosmesis, quality of life (QoL), costs, timing of treatments, feasibility, and whether the eMDT was of assistance to the referring GP.

When the eMDT finally began, data was collected on patient characteristics: sex, age, distance from home to our hospital, who referred, immunosuppression status, and the diagnosis or not of a true CSC. We also collected data on what the referrer's question was for the MDT, and whether a decision was made to advise the referring clinician of the treatment recommendation. Finally, we collected data on the meetings themselves including the meeting date, who attended, the number of cases per meeting, whether the case was a new or a review patient, and whether the decisions made by the MDT specialists were unanimous. Data were retrospectively retrieved and the results were then tabulated.

Results

Ethics submission was not obtained nor were research resources allocated.

1. Establishing whether there is a need for a skin eMDT.

a) Rural doctors survey

At the rural GPs conference, despite the distribution of many survey forms (number unknown), only five surveys were completed and returned. The response rate can therefore not be assessed.

From the five returned surveys, there was unanimous agreement for the need for more timely access to specialist care for non-metropolitan CSC patients. The survey also revealed that the average number of kilometres (km) a patient must travel from their residence for specialist care was approximately 140 km, and that the average wait time for specialist care for patients with CSCs was approximately five months. Four out of five (80%) survey respondents did not have an established referral pathway for patients with CSCs. Many conversations were had with GPs at the conference and all identified a need. There were no negative verbal or written comments about establishing a pilot eMDT.

b) Asking previous non-metropolitan referrers

Ten non-metropolitan GPs were contacted by the specialists conducting the eMDT clinic, and all were favourable to the idea.

c) Contacting potentially interested non-metropolitan GPs

Five non-metropolitan GPs were contacted and all were supportive towards the eMDT.

2. Meeting data

Data from the meetings are detailed in Table 2. In total, seven meetings were held each fortnight over 13 weeks. Nineteen patients in total were presented. Two of these were presented twice. None required a histological slide or imaging review. Eighteen were self-referred from within the specialist team that was present on the meeting calls. ROs presented most of the patients (11/19), possibly because there were more ROs (3) than other specialists (regular surgeon = 1, dermatologist = 1, medical oncologist = 1) participating. Only one referral came from a rurally based GP who had heard about the initiative while attending the rural GPs conference.

Table 2 Meeting characteristics

Meeting No.	Meeting Date	Specialists attending	No. of cases New/review	New Pt referral from	Decisions made on outcome Y/N	Unanimous decisions
1	3/8/20	Sx, Der, RO, MO	2/0	RO 2	yes	yes
2	17/8/20	Sx, Der, RO, MO	4/1	RO 2 Sx 2	yes	yes
3	31/8/20	Roll not taken	3/1	RO 3	yes	yes
4	14/9/20	Roll not taken	3	RO 2 GP 1	yes	yes
5	28/9/20	Roll not taken	3	Sx 3	yes	Not documented
6	26/10/20	Roll not taken	3	RO 1 Sx 1 Der 1	yes	Not documented
7	9/11/20	Roll not taken	1	RO 1	yes	Not documented
Totals	7 over 13 weeks	2 meetings had full specialty representation; 5 unknown	19/2	RO 11 Sx 6 Der 1 GP 1	All yes	4 meetings had unanimous decisions; 3 unknown

Abbreviations: Sx; surgeon, Der; dermatologist, RO; radiation oncologist, MO; medical oncologist, No; number, Pt; patient, Y; yes

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Patient characteristics are detailed in Table 3. Of the 19 patients evaluated, there were 12 males. The average age of all patients was 69 years (range: 33-92). The average distance from the patient's place of residence to treatment was 75kms. Six patients had an ECOG performance status of one or more. Five were immunocompromised. Eighteen were truly complex as per our definition in Table 1. All were reasonable cases to present. Eighteen had clearly documented decisions made by the eMDT.

Table 3 Patient characteristics

Meeting; Pt No	Sex/Age	Distance from home (Kms)	ECOG/ Immuno/ Complex	Question to MDT	Decision
1;1	M/81	20	2/N/Y	Persisting ulcer Post RT	Conservative Mx
1;2	F/33	75	0/N/Y	Nasal T1 BCC persisting Post Imiq	Def RT and if fails then Sx
2;3	M/68	8	0/Y(HIV)/Y	T1 SCC lip into muscle, PNI	Good margins Observe
2;4	M/81	40	1/Y(MG)/Y	T2 scalp SCC 10mm thick	Good margins Observe
2;5	M/70	4	0/N/Y Anticoagulated	PDSCC failed SSG on scalp with PNI 0.2mm	Observe - Recovering on review
2;6	F/38	40	1/Y(Tx)/Y	T2 PDSCC lip	Def RT and if fails then Sx
3;7	M/89	10	0/N/Y	T1 MDSCC Lip PNI	Observe
3;8	M/81	2	0/N/Y	MCC lip Best FU?	3/12 PE 6/12 PET
3;9	M/45	25	0/N/Y	MDSCC Cheek Piecemeal excision	Adjuvant RT
4;10	M/87	324	1/N/Y	RT field edge recurrence	Def SXRT
4;11	F/72	25	0/N/Y	T1 BCC nose + margin	Adj SXRT
4;12	F/80	557	0/N/Y	T2 BCC Chest PNI	Observe
5;13	M/92	37	1/Y/Y	T3N2 Mel	Palliation
5;14	M/80	10	1/Y/Y	Mult BCCs	Def RT
5;15	F/50	43	0/N/Y	Mult rec BCCs	Def RT
6;16	M/76	17	0/N/Y	Rec SCC	Def RT
6;17	M/75	120	?	BCC LVSI	unclear
6;18	M/61	30	0/N/Y	BCC PNI	Adj RT
7;19	F/57	34	0/N/N	BCC nose tip	Def RT
Totals/Ave	F6; M13/69	75	6 not ECOG 0 5 Immuno 18 Complex	All reasonable	18 clear decisions

Abbreviations: MG; myasthenia gravis on steroids, Imuran; HIV; human immunodeficiency virus, T1; TNM tumour stage 1[17], T2; TNM tumour stage 2, BCC; basal cell carcinoma, SCC; squamous cell carcinoma, PNI; perineural invasion, mm; millimetre, PDSCC; poorly differentiated squamous cell carcinoma, SSG; split skin graft, Def; definitive, Pt No; patient number, Tx; transplant, ECOG; eastern cooperative oncology group – a measure of performance status, MCC; merkel cell carcinoma, FU; follow up, PE; physical examination, PET; positron emission tomography scan, + - positive; Mel; melanoma, Rec; recurrent, LVSI; lymphovascular space invasion, Adj; adjuvant, Ave; averages, Immuno; immunosuppressed, Imiq; imiquimod, SXRT; superficial radiotherapy, Sx; surgery

Data was not collected on oncology outcome at one year, functionality and cosmesis, QoL, costs, timing of treatments, feasibility, and whether the eMDT has been of assistance to referring GP.

Discussion

1. Structure and function of the eMDT

a. Staffing

After consulting experts and possible eMDT colleagues, we decided to staff the eMDT with volunteer specialists who were already part of our face-to-face hospital-based skin MDT. We thought this would be more appropriate for continuity in that if a patient was referred and admitted to our hospital the same skin specialists would be involved in the patient's inpatient care.

A plastic surgeon, dermatologist, radiation oncologist and medical oncologist were considered essential for the eMDT. A terms of reference document (ToR) was generated. A clinician 'chair' was appointed. Certain specialists were invited and all of those invited agreed to be involved. Each then identified a colleague who could fill in for them in case of absence, guaranteeing redundancy. Each signed the ToR for the eMDT and gave proof of their current qualifications and medical indemnity cover.

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An interested dermato-pathologist was identified. However, this position was not considered essential to any real time meetings and we decided to rely on the initial histology report. If histological clarification was thought to be warranted, the histopathologist would be consulted to provide a slide review in time for the next meeting. Radiology was treated similarly. The imaging report was to be considered true, and if the images were to be interrogated, a film review would be done with a radiologist offline.

We selected an appropriate electronic platform. Patients were not charged any out-of-pocket fee to have their case discussed in the pilot phase. Any monies earned by the eMDT through patient health insurance billing was used to cover the administrative costs of the eMDT. A clinical nurse consultant (CNC) was paid to provide administration support. The CNC would report to the chair for meeting requirements.

b. Function

Initially we thought that the eMDT could operate by metachronous consultation; that is, that the specialists involved would not have to get together at the same time. The planned workflow was that the GP would identify and consent the patients and contact the responsible CNC who would then collect patient information from the referring clinician's practice (e.g., photos, histopathology reports, referral letter etc.), and format these for the eMDT chair who would review the case. The chair would then ask the specialists thought relevant to supply a written opinion. These opinions would be collated by the chair and sent back to the referring doctor with the group's opinion. The eMDT would also suggest a treatment pathway through our hospital into which the GP could refer. If the GP wanted to refer elsewhere, for example, to a more local treatment centre, then that would be their prerogative. The GP could use the eMDT recommendation to inform the new alternate pathway with assumed permission from our eMDT. The eMDT could even suggest an alternative treatment pathway via another institution located perhaps closer to home. This would help to achieve the aim of the eMDT – to enhance the journey for patients with CSCs and facilitate timely care options for GPs.

Some of the specialists agreed to be involved in the eMDT based on its format of metachronous consultation. However, it soon became apparent that real time or synchronous discussion was necessary, necessitating the need for specialists to be available at the same time. As the demands of conducting the eMDT had now changed, some members of the eMDT had some understandable difficulty with attendance. Meetings were held fortnightly as it was thought that monthly was too long to wait for a patient with a CSC and would not achieve the improved access to treatment that the eMDT aimed to deliver.

We initially designed the eMDT as a pilot study. It was envisaged that the pilot eMDT study would a) lead to an understanding of whether this service was of value to rural GPs; b) provide access to skin patients who currently may not be receiving high quality care; c) deliver a reliable service and platform in an eMDT format for rural doctors and specialist clinicians to discuss patient cases; and d) provide opinions on treatment recommendations and rapid access referral pathways to specialists, if required. We therefore planned to collect data on oncologic outcomes at one year to include functionality and cosmesis, QoL, costs, timing of treatments, feasibility, and whether the eMDT was of assistance to referring GPs.

This pilot study was to be submitted for ethics approval with research resources allocated. Endpoints were chosen to give an objective measurement of the success of the pilot. These included metrics to see if the time it took for a rural doctor to receive a specialist management opinion improved, if access to specialist care for patients was enhanced, and if there were better patient outcomes, such as disease control, function and cosmetic acceptability at one year. More subjective measures were to see if the eMDT delivered better patient QoL, and if the referring doctor also experienced a better care journey for the patient. The latter was considered an interesting statistic to capture as it was thought that referring doctors generally have poor journey experiences given the results of our initial survey. This is because the referring doctor may have a better understanding than the patient of the seriousness of a complex skin cancer diagnosis, for example, in the event of a melanoma or Merkel cell carcinoma, and experience increased levels of anxiety until a specialist treatment pathway had finally been established. This data was not collected as detailed below.

The eMDT, which was initiated before the COVID-19 pandemic started, was discontinued after seven meetings due to several factors. These included the fact that the main hospital face-to-face skin MDT was also moving to an electronic platform with the arrival of Covid. The decision was made to amalgamate, and so the eMDT was combined with the monthly main hospital skin MDT. This meeting continues to run virtually. Further studies of this nature may no longer be useful as the pandemic has now justified the use of telemedicine.

The eMDT was conducted with great respect and camaraderie between the involved specialists; however, the pilot suffered from several issues. The initial design as a metachronous meeting was an error. It was not a properly conducted research study as adequate resources were lacking, and it started prior to any ethics submission. As the status of the pilot as a research project with data collection declined, so too did the quality of documentation. For example, the discipline of the attending specialists was only recorded for the first two meetings. Therefore, the true multidisciplinary nature of subsequent meetings could not be guaranteed. Whether or not patient management decisions were unanimous was not recorded for the last three meetings. There were also issues with process - in the available records, there are cases where it is not clear if the referring doctor(s) were sent a letter from the eMDT specialists outlining the disease management opinion. This may have been because the referring doctor was always present in the meeting anyway and heard the opinion; however, this is not good enough for an MDT let alone a research project.

At doctor level, there were concerns about the eMDT. There was insufficient uptake from the non-metropolitan GPs who were considered the target group of referrers. We think this was due to inadequate message penetration rather than the lack of need. Only one patient came from a rural GP, so the eMDT was never really tested for the purpose it was intended to serve. Most of the MDT opinions were for either adjuvant or definitive radiotherapy. There may be some bias observed because a greater number of ROs, compared to other specialists, participated and brought cases for discussion.

The reasons why rural GPs were not the main referrers was debated in hindsight with the help of a GP colleague (Dr. RM) who represents many regional GPs. Non-referral was felt to be mainly due to either a lack of knowledge of the MDT and its existence, or an overall lack of experience with MDTs. Referral pathways are built on relationships, involve trust and take time to develop.

GPs may also be reluctant to attend an MDT because they a) receive little assistance and are too time poor; b) may not understand the jargon used in the process and therefore not know how to

contribute; and c) may not wish to attend for privacy or other concerns if different patients are discussed. One potential solution to attract GPs may involve creating a separate section within the MDT for the GP. This would need to be scheduled in advance as most regional GPs are booked out for weeks. Other solutions may include regular emails and education to include updates on staging criteria, or descriptions of specific treatments and 'special' side effects that the GP can feel confident to discuss with patients. A commonly used jargon sheet would also be helpful.

From the MDT specialists' perspective, involving the GP in the MDT is beneficial, especially when it comes to understanding more about a patient's social situation or treatment preferences. For example:

- The level of family support and how to garner it
- What community support may be available and how is it best accessed
- The patient's employment or socio-economic status, and how to reduce the financial impact of a CSC diagnosis and treatment
- Reasons for treatment refusal
- Travel issues to and from treatment and how to best overcome these concerns
- How the patient is coping overall
- The provision and availability of local follow up care

Another concern from doctors was the perception that the eMDT was competing with other MDTs. It did compete with our own hospital-based MDT which is why we wanted to ensure that our patients came from outside our own hospital's heath catchment area. On average, patients in our pilot lived 75 kms from our hospital, which helped to relieve this concern. There were also concerns that our eMDT may impact referrals to other catchment areas and that we were competing on "turf" that was not our own.

There was some concern that our eMDT was open to specialists who were not on staff at our hospital. Munro et al.[18] mentions the idea of 'tribalism' and its influence on MDTs. The tribe may be thought of as clinicians belonging to the same discipline or to the same health facility. Tribal allegiances and social identities may, just as in a traditional MDT, cause problems with the effectiveness of a virtual team. This is especially so in an eMDT which is precisely aimed at delivering better care to those outside of immediate health area. Unconscious loyalty to the discipline or facility may impact the delivery of best outcomes. Hopefully, with the continuing disruption and democratisation of the internet, and the prioritisation of patient's needs over disciplines or institutions, these influences will decrease over time.

Conclusion

We report on the operation of a pilot eMDT for complex skin cancers that aimed to create better access to care for non-metropolitan patients. On limited enquiry, there seemed to be a need for this service. The creation of the eMDT was associated with good engagement from specialists. There were problems with the initial design of metachronous versus synchronous meetings, which were overcome thanks to the good will of the attending specialists. The actual meeting dynamics enabled all attendees to give treatment recommendations and appropriate group opinions were delivered, usually unanimously. Of the 19 patients presented, only one came, however, from the targeted referrer group (non metropolitan GPs). All other referrals came via the attending specialists. There were issues with adequate documentation and data recording, and a proper research mentality was lacking, e.g., the project was not submitted to an ethics committee. The eMDT was ultimately phased out and assimilated into the hospital's main skin MDT. This was because it was not serving the target referrer and doctor population, there were issues with perceived competition both within and outside the hospital's health catchment area, and the pandemic forced the hospital's main skin MDT to operate virtually.

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