

Management of minor burns during the COVID-19 pandemic: A patient-centred approach

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Abstract

Introduction: The UK government introduced lockdown measures on 23 March 2020 due to the first wave of the COVID-19 pandemic. A restructuring of clinical services was necessary to accommodate mandatory changes while also maintaining the best possible standards for patient care. The present study explored the initial management, follow-up and patient-reported outcomes of burn injuries <15% total body surface area (TBSA) during the height of the COVID-19 lockdown at a tertiary burns centre.

Methods: A retrospective review of all adult patients with burns <15% TBSA during the national lockdown (23 March 2020 to 10 May 2020) was undertaken at The Queen Elizabeth Hospital Birmingham (QEHB), UK. All referrals from non-QEHB telemedicine (external) or QEHB emergency (internal) departments were reviewed for management, length of hospital stay and pattern of follow-up (ward attender, self-care, community or outreach nurses). A telephone survey based on a structured questionnaire was conducted to establish patients' satisfaction.

Results: A total of 84 burn patients were included in the study. The mean age was 39 years (age range = 19–91 years) and the male:female ratio was 4:1. Patients were managed non-operatively (n = 69, 82%) or operatively (n = 15, 18%). Patients attended the ward attender acute burns clinic only once (n = 36, 61%). The telephone survey captured 70% (n = 59) of the study population and 57 patients (97% of respondents) were pleased with the ongoing care and burn healing.

Conclusion: The integration of patient led self-care, reduction in admissions, minimal clinics attendance and a telemedicine follow-up is an effective model for small burns management during the COVID-19 pandemic. A high degree of patient satisfaction was achieved with continuous and approachable communication channels with the burn multidisciplinary team. We continue to implement this effective model of burns management throughout the COVID-19 pandemic and the subsequent period.

Keywords

Telemedicine, COVID-19, burn management, lockdown, self-care, patient satisfaction

Lay Summary

The lockdown measures due to the first wave of COVID-19 pandemic affected the way we manage all medical emergencies including burns. The initial management, follow-up and patient satisfaction for small burn injuries during lockdown has not been reported previously. The aim of this study is to examine

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the outcome in terms of small burn management, hospital stay, number of clinic reviews, healing and patient satisfaction during the lockdown period in a burn centre in the UK. This would look at the need for operations and whether patients stayed longer if they required an intervention. We reviewed adult patients with small burns during the national lockdown (23 March 2020 to 10 May 2020) at The Queen Elizabeth Hospital Birmingham (QEHB). All referrals from telemedicine, referral system (external) or QEHB (internal) were reviewed for management, length of hospital stay and pattern of follow-up. Patients were reviewed in the acute burns clinic and given advice for burn management and dressing for self-care. Follow-up was mostly via email (telemedicine). A telephone survey based on a structured questionnaire was conducted to find out patients' satisfaction. Four times more men than women had small burns during the lockdown period. The average age was 39 years. The majority were managed conservatively with dressings (82%) and a small proportion required an operation (18%). Most patients attended the acute burns clinic only once (61%) for initial assessment and management. The telephone survey captured 70% of patient and 97% of respondents were pleased with the care and burn healing. The integration of patient-led self-care, reduction in admissions, minimal clinics attendance and a telemedicine follow-up is an effective model for burns management during the COVID-19 pandemic. A high degree of patient satisfaction was achieved with continuous and approachable communication channels with burn multidisciplinary team. We continue to implement this effective model of burns management throughout the COVID-19 pandemic and the subsequent period.

Introduction

The first reported case of COVID-19 (SARS-CoV-2) in the UK was on 30 January 2020.¹ The burn care service at Queen Elizabeth Hospital Birmingham (QEHB) provides the Adult Burn Centre for the Midlands Burn Operational Delivery Network serving a population of over 13 million. The majority of burn patients at QEHB are suitable for Burn Unit and Burn Facility level of care and come from a catchment area in and around Birmingham with a population of about 2.4 million.^{2,3}

The hospital response to the COVID-19 pandemic included reallocation of specialist burn staff to other clinical areas, restricting admission of patients to those requiring essential care that could only be delivered in-hospital, moves to minimise outpatient footfall and stringent patient flow controls to segregate COVID-19 cases from non-COVID-19 cases. To meet these requirements, the burn team had to review the care pathway for <15% total body surface area (TBSA) burns with the aim of minimising attendances and admissions. This was aided by the well-established pathways of care that exists for the management of burns not requiring intravenous fluid replacement for this cohort.

The burn service has a funded resource designed to allow for early decision making as to treatment needs of burns not requiring immediate admission. To reshape the burns service for COVID-19, additional measures were introduced to streamline the management of patients. First, a consultant delivered service on the first review

of patients or referrals to ensure accurate initial assessment, treatment plan including decisions regarding surgical management and planned admission to the burns centre. Second, a telemedicine referral service and new email system were created to allow patients to send photographs and updates regarding the burns. Third, patients had ownership of the burn wound and dressings. This entailed self-management of the burn wound by patients who had been provided with dressings. If the patient was unable to self-care for burns, various professional-led services were made available.

The aim of the present study was to evaluate the impact of the changes in the management of <15% TBSA burns during the first wave of the COVID-19 lockdown period at QEHB.

Methods

Data of all patients with burns <15% TBSA referred to the QEHB Burn Service during the first wave of the COVID-19 pandemic in the UK (23 March 2020 to 10 May 2020) were retrospectively reviewed. Information was retrieved from electronic records using multiple databases. Approval from the internal clinical governance department was obtained before data collection in accordance with hospital guidelines.

Burns <15% total TBSA seen in the QEHB and followed-up for a minimum of three weeks after burn injury were reviewed in the study. Patient information extracted included age, gender, burn %TBSA, whether non-operative or

operative (surgical) management was required and method of follow-up (ward attender, self-care, community or outreach nurses). The reason for admission and duration of hospital stay was noted. Burn assessment in terms of depth and TBSA, social and psychological factors influenced the type of follow-up and further management. Patients were given clear instructions on timing and method to reapply dressings. This guidance was provided by junior doctors and nurses upon review in the acute clinic or responding to referrals. Patients attending the acute clinic review were seen or discussed with a consultant burns surgeon to streamline management. Individualised patient circumstances and social support network were considered when planning further follow-up.

As part of the patient follow-up, a new email account for the burns unit was created for our telemedicine protocol. This was utilised for community referrals and to allow patients to send photographs of the burn regularly after the initial review in the acute burns clinic to monitor the burn healing. The email was reviewed daily to decide if patients required any face-to-face acute clinical reviews (ward attender), surgical input or continued self-care. Follow-up was remote based on warning patients of any red flag signs of infection. This approach led to an apparent reduction in the number of reviews in our unit for regular dressing changes. Patients who were anxious, lacked Internet access, no social support, had dressings in anatomically sensitive areas, were not registered with a general practitioner, had no access to dressings in the community or were very young were planned to be seen again as a ward attender.

A telephone survey was conducted for all patients that burn healing with non-operative management was anticipated. These patients were contacted via phone call three weeks after burn injury. This was based on a structured questionnaire followed by individualised questions to determine burn healing, the number of dressing changes, how the dressings were changed (ward attender, self-care, community or outreach nurses), or the need for additional support from the burns centre via email or phone-calls.

Psychology team and therapists input

The multidisciplinary team input in terms of psychological support or therapist input was modified during the lockdown period. The burns

psychology team were completely redeployed into staff support and were therefore not able to offer any direct psychological input (including assessment or intervention). The burns team were asked to refer to the psychology team as usual who offered a brief consultation with the nursing team on shift by telephone and sent relevant psychological information and resources that the team could use with the patient (e.g. psychoeducation about trauma and using relaxation and grounding techniques). Burns therapists (physiotherapists and occupational therapists) were also redeployed to other wards. Outpatient services were reduced to urgent/essential new patients or reviews only. This meant that any patient who had a therapy treatment plan in place and was not at risk of immediate deterioration of range of movement, strength or scar hypertrophy were put on hold with the emphasis on the patient contacting if they had any concerns. Therapists continued to accept referrals and see new burn patients who attended for a change of dressing and required therapy input. Patients would continue to be reviewed by a therapist at their change of dressing if deemed essential. Once a patient no longer required attendance at the hospital for change of dressings, they were prioritised for therapy input based on their therapy needs and either seen face-to-face, via telephone or video review, or put on hold.

Results

Patients' demographics and %TBSA burn

A total of 84 burn patients (65 men, 19 women; M:F ratio = 4:1; age range = 19–91 years; mean age = 39 years) were included and further analysed in the study. Those referred via telemedicine (non-QEHB referral) were either mostly <5% TBSA (n = 32) and the remaining cases were 5%–10% TBSA (n = 6). Three referrals were excluded from the study (inhalational injury, n = 1; transfer to local burns unit, n = 1; >15% TBSA, n = 1). All burns from the QEHB emergency department (ED) were <5% TBSA (Figure 1).

QEHB emergency department (internal) versus non-QEHB telemedicine (external) burns referral

Burn referrals were made from both the QEHB ED (internal) and non-QEHB telemedicine (external) (n = 46, 55% and n = 38, 45%,

QEHB ED Burn (Internal) n = 46		n (%)
Admit		1 (1)
Ward Attender		8 (10)
Self – Care		19 (23)
Community follow-up		18 (21)
Non QEHB Burn (External) n = 38		
Admit		1 (1)
Ward Attender		20 (24)
Out of Hours - Ward Review		6 (7)
Keep at Referring Hospital		11 (13)

Figure 1. The destination based on referral pathway of patients with <15% TBSA burn.

respectively). Two patients were admitted to the burns ward (inpatient) after the initial assessment: one from QEHB ED for medical reasons (cardiac arrhythmia); and the second (external) was for the management of full thickness burn and pain relief. The pattern of follow-up for QEHB and non-QEHB is summarised in Figure 1.

Patients requiring subsequent admission based on clinical review

The majority of burn patients did not require hospital admission (n = 69, 82%) and were managed non-operatively. The remaining patients were admitted for various reasons (n = 15, 18%) summarised in Figure 2. Reconstruction with a split thickness skin graft (STSG) was used if burn excision was performed (n = 11, 13%). Hospital stay was either a day surgery (n = 4, 5%) or inpatient hospital stay (n = 11, 13%). The mean length of inpatient stay was five days (range = 1–19 days). The reasons for prolonged inpatient burns centre admission was based on the need for rehabilitation, medical, social or psychological intervention or a combination of these factors. One patient was readmitted due to an unhealed burn and required excision of a full thickness burn as well as STSG reconstruction (Figure 2).

Burns ward attender follow-up frequency

Patients reviewed as ward attenders (Figure 1) were clinically reviewed to determine burn management and subsequent follow-up (self-care, ward attender, community or outreach nurses, discharge). All patients were given the telemedicine email account to allow open communication and address concerns at any point. Overall, the number of face-to-face reviews as a ward attender were one (n = 36, 61%), two (n = 12, 20%), three (n = 6, 10%) or four/five clinic appointments (n

= 5, 9%) (Figure 3). The number of visits were related to burn severity, social support network, pain relief supplements, difficult anatomical areas to self-care and apply dressings, postoperative cases, a TBSA >5% and the patient's choice.

Telephone survey

The total number of patients who responded to the telephone survey was 59 patients, forming 70% of the study cohort (Figure 4). The remaining 25 patients (30%) did not respond to attempts to contact them.

The survey showed that the majority of patients' burns had healed well with regular dressing changes (n = 53, 90%) while the remaining patients had a small portion of the wound that had not yet healed at the time of survey contact (n = 6, 10%). A mean of five dressing changes (range = 1–20) was required to enable full healing of the burn. Most patients (n = 36, 61%) were able to change the dressing independently or with the help of a member of their household. The patients who required help with dressings (n = 22, 39%) were seen in as a ward attender or seen by a community nurse. Over half the patients (56%, n = 33) required additional support from the burns unit, either via email or phone calls. This would be in the form of getting advice or to address any concerns. Only two patients (3%) were unsatisfied with the overall burn care due to the inconvenience of the appointment times. Both patients had a self-acknowledged background of high-level anxiety and found attendance to clinics stressful during the COVID-19 period (Figure 4).

Psychology team and therapist input

None of the patients in this cohort required face-to-face psychological support. In terms of

Number	Hospital Stay (Days) *	Reason for Admission	Days - Referral to Admission	Referral	Total % TBSA, % Full Thickness (FT)	Operations	SSG
1	5	Full Thickness	1	Other Trust	5, 1.5	1	Yes
2	2	Full Thickness	1	Other Trust	4, 3	1	Yes
3	0	Full Thickness	0	QEHB	1, 1	1	Yes
4	0	Full Thickness	0	QEHB	3, 3	1	Yes
5	0	Full Thickness	0	QEHB	2, 2	1	Yes
6	3	Infection	2	QEHB	0.75, 0.75	1	Yes
7	2	Infection	0	QEHB	2, 0	0	No
8	6	Medical - Arrhythmia	0	QEHB	4, 0	0	No
9	1	Airway Concerns	0	QEHB	1, 0	0	No
10	3	Airway Concerns Safe Guarding	0	QEHB	3, 0	0	No
11	0	Burn Scrub GA	0	QEHB	5, 0	1	No
12	1	Psychiatric Assessment	0	QEHB	1.5, 0	0	No
13	5	Burn Scrub GA	1	Other trust	13	1	No
14	19	Full Thickness, Physiotherapy	0	QEHB	11, 3	2	Yes
15	5	Social issues, Package of Care	0	QEHB	10	0	No
Readmitted	4	Full Thickness - unhealed	1			1	Yes

Figure 2. The aetiology of burn injury for hospital admissions (inpatient or day surgery) and performed operations. *Zero (0) indicates a day-surgery procedure.

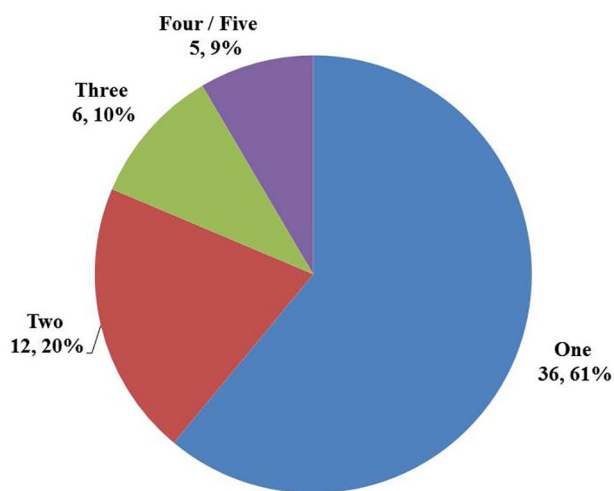


Figure 3. Frequency of ward attender clinics by patients with <15% TBSA burns.

therapists input, a total of 13 burn patients (15%) were referred and seen by physiotherapy and one patient by occupational therapy.

The number of appointments each patient received was based on their therapy requirements and was a mean of six appointments (range = 1–23). Face-to-face appointments continued later for 12 patients (14%) and one was reviewed only by telephone because they were referred for therapy input after discharge and could be appropriately managed in this way. Once healed, 9 of 13 patients (10%) required ongoing therapy input, which was provided via a combination of virtual and face-to-face appointments. Ongoing care and review continued for seven patients (8%) by physiotherapy either for scar management, range of movement or strengthening programmes.

Discussion

The first wave of the COVID-19 pandemic presented the medical community with a series of challenges to provide optimal patient care. A structured national approach to burns care in

	n (%)	n (%)
1) Has the burn healed?	Yes 53 (90)	No 6 (10)
2) How many times were your dressings changed outside of Hospital?	Median = 5	Range (1-20)
3) Were you able to change the dressings themselves or by another member of the household?	Yes (Same household)	No (Required help)
	36 (61)	22 (39)
4) Did you seek additional support from the burns service (email/phone)?	Yes 33 (56)	No 26 (44)
5) Were you satisfied with the burns service you received?	Yes 57 (97)	No 2 (3)

Figure 4. Telephone survey for burns healing, self-care and patients' satisfaction.

the UK was streamlined through guidelines issued by the NHS and British Burn Association.⁴ Resuming normal clinical priorities in an abnormal public health environment has historically presented challenges during a pandemic.⁵ The burns centre at QEHB recently reported the pattern of reduction in burn admissions and referrals in the West Midlands during the COVID-19 UK-wide restrictions.³ This study specifically evaluated the management of <15% TBSA burns during the first wave of the COVID-19 pandemic lockdown period. It highlighted a set of reviewed changes to the management of this cohort that continue to be applied with the ongoing COVID-19 pandemic.

An important part of ensuring safe burn care is the provision of adequate prevention measures of COVID-19 transmission to staff or patients.⁶ Members of the burns team were wearing personal protection equipment and patients were provided with masks when attending acute clinic reviews in the ward.⁷ All patients were questioned about symptoms of COVID-19 before visiting at the time of referral and on arrival to clinics.⁸ With prior approval, only one person was allowed to accompany the patient on the hospital visit. The general principle of management of small burns (<15% TBSA) was to 'see and treat' with 'advice and follow-up' of patients. The emphasis was placed on the accurate assessment of burns by a consultant and the continuous follow-up and review of the patient outside the hospital environment. This helped in allowing patients to take responsibility of their burn care with the provision of regular dressings until healed. Patients sent photographs to a designated email address to self-report progress of the burns as a safety net to monitor healing progress.

The priority set in our unit was the provision of safe burns care to ensure timely healing and prevention of complications during the COVID-19 pandemic. These external referrals seen at

QEHB were reviewed at least once by the on-call burns consultant as a ward attender in the acute burns clinic. This ensured the senior management decision to reduce the number of hospital visits and further follow-up. Senior consultant input and reviews based on telemedicine photographs or acute burns clinic review as ward attenders ensured appropriate direction in patient management.⁹

The initial assessment and further communication with telemedicine via emails or phone calls determined the nature of follow-up for these small burns. The challenges set by patients and burn factors may have led to more than one visit to ensure optimal care was provided. A main concern of one of the patients was pain relief during self-care dressing changes. This was addressed by providing them with a supply of appropriate analgesics at the initial review. Clear instructions and contact details were given as part of our safety-netting. There were challenges with self-care in patients who required extra analgesia and some patients were unable to access additional pain relief from their general practitioner services. Additionally, some patients struggled to obtain help with further dressing changes in the community and could not obtain help from the outreach nursing team or general practitioner nurses. Furthermore, the burn wound may be in a sensitive or difficult to reach area for self-care. It was appreciated that self-care with or without community support would not be applicable in all cases and some patients would require further clinical review in the hospital environment as a ward attender.

Consultant-delivered decision making allowed a further reduction in attendance to clinics, ensured a streamlined approach and avoidance of subsequent clinical review for superficial burns and gave an opportunity for training. We noticed a good level of patient compliance and ownership of burn care. Compliance was determined by

asking patients to send photographs at the time of dressing change to monitor progress and address any issues. Safety-netting with phone calls by patients and telemedicine emails provided further reassurance for patients about the healing progress. The importance of telemedicine on follow-up, initial assessment and burns team communication during the COVID-19 era is echoed in the recent literature.¹⁰

To relieve the workload at QEHB ED, all burn referrals, no matter how small, were reviewed as out-of-hours ward attenders in the burns centre. Referrals were screened for any symptoms of COVID-19 before review in the burns unit. A one-page guide was designed for all junior doctors taking referrals to standardise the triage process for acute burns. A telemedicine review of external referrals proved effective in reducing patient attendance at QEHB. Triage of external referrals for small burns was based on multiple factors related to burn %TBSA, depth and benefit from transfer to burns unit. Detailed advice was given to referring hospitals for optimal burn care management similar to our inpatient management approach. This was particularly important for 5%–15% TBSA burns deemed superficial enough to heal with the appropriate regular dressings. This further added to the reduction in the transfer of patients and admission to the burns unit. This pattern is confirmed by many existing studies about burns epidemiology in burn units.¹¹ Access to emergency theatres was prioritised for unhealed, infected, full thickness or life-threatening burns. Operative management with burn excision and STSG enabled better healing and would ultimately reduce the burden of prolonged follow-up from longer healing time. The multidisciplinary team input from psychologists and therapists continued and were modified during the pandemic. This further helped achieve a more optimal outcome of burn care during these challenging times.

The patient survey revealed a good level of satisfaction with the care provided throughout the healing process. Patients appeared well informed about the nature of the burn management and further self-care. This was perhaps due to the regular reassurance, providing written information to the patient with customised plans as to how they should manage their burns, as well as where and how to obtain additional help should it be required. This study revealed the patients' ability to successfully self-care for burns, as shown by the results of good healing within three weeks of the initial injury. It showed that patients' awareness of concerning signs and

contact details for team members further reassured them when self-care for burn.

The burns service at QEHB continues to use this approach to manage small burns as the ongoing COVID-19 pandemic progresses. Our evidence to date suggests that this approach is safe and efficient. It remains to be seen if this approach will become the default pattern for managing this type of burn.

Conclusion

The model of minimal follow-up in clinics, use of telemedicine and patients' self-care for small burns during the height of the COVID-19 pandemic continued to be effective at a tertiary burns centre in the West Midlands, UK. It provided a new platform to empower patients and allow the safe and effective delivery of burns care. Telemedicine was a reliable tool to streamline and coordinate communication with patients, team members and other hospitals or settings. It might be that this approach becomes our default system beyond the pandemic.

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