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Adherence to the emergency management of severe burns referral criteria in burn patients admitted to a hospital with or without a specialized burn center

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ABSTRACT

Background: The primary aim was to determine to what extent referral and admission of burn patients to a hospital with or without a burn center was in line with the EMSB referral criteria.
Methods: This was a retrospective, multicenter cohort study. Burn patients admitted from 2014 to 2018 to a hospital in the Southwest Netherland trauma region and Network Emergency Care Brabant were included in this study. Outcome measures were the adherence to the EMSB referral criteria.
Results: A total of 1790 patients were included, of whom 951 patients were primarily presented to a non-burn center. Of these patients, 666 (70.0%) were managed according to the referral criteria; 263 (27.7%) were appropriately not referred, 403 (42.4%) were appropriately referred. Twenty (2.1%) were overtransferred, and 265 (27.9%) undertransferred. In 1213 patients treated at a burn center 1119 (92.3%) met the referral criteria. Adherence was lowest for electrical (N = 4; 14.3%) and chemical burns (N = 16; 42.1%), and was highest in 'children ≥5% total body surface area (TBSA) burned' (N = 109; 83.2%).
Conclusion: The overall adherence to the referral criteria of patients presented to a non-burn center was fairly high. However, approximately 25% was not transferred to a burn center while meeting the criteria. Most improvement for individual criteria can be achieved in patients with electrical and chemical burns.

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1. Introduction

Because burn injuries can have major physical and psychological impact, it is important to refer patients with complex burns to a specialized burn center [1]. In order to assist clinicians in identifying patients that may warrant transfer to a facility that has special expertise in the treatment and rehabilitation of more extensive burn-related injuries, referral criteria have been implemented. Burns associations that have implemented referral criteria include the American Burn Association [2], the National Health Services in the UK [3], the Australian & New Zealand Burn Association [4], and the European Burns Association. In the Netherlands, the Dutch Burn Foundation has adopted the Emergency Managements of Severe Burns (EMSB) referral criteria [5]. Although these criteria have been used for more than two decades, no information is available about their adherence when referring patients from a non-burn center to a burn center or *vice versa*.

Previous studies only investigated adherence rates to local or national criteria. In the United Kingdom, 25% and 74% of the patients presented to a general or pediatric emergency department respectively, were not transferred to a burn center while meeting at least one of the referral criteria as designed by the British Burn Association [6,7]. In the United States, 48% and 54% of the patients treated at non-burn centers were inappropriately not transferred to a burn center [8,9]. One study assessed the accuracy of burn size estimation in pediatric patients, according to the EMSB referral criteria, and found that 20% was referred without meeting the referral criteria regarding burn size [10]. Currently, no studies have been conducted regarding the adherence to all EMSB referral criteria.

The primary aim of this study was to determine to what extent referral and admission of burn patients to a hospital with or without a burn center was adherent to the EMSB referral criteria as used in the Netherlands. Referral can be primary by the prehospital health care provider or secondary from a non-burn center to a burn center. The secondary aim was to determine whether adherence is related to the number of criteria present.

2. Material and methods

2.1. Study design & setting

In the Netherlands, clinical health care is provided by 120 hospitals. All hospitals have to participate in a regional trauma network, the so called Trauma Regions. Each region has a governmentally assigned (Level 1) trauma center. Three non-trauma centers have been assigned as a supraregional burn center by the government in order to provide advanced burn care and to improve patient outcomes. Prehospital care is provided by independent, governmentally organized ambulance services on a regional level. Depending on the suspected injuries and physiological status, a trauma patient is referred to the closest hospital, a regional trauma center or a supraregional burn center. Approximately 1000 patients undergo acute hospital admission for burn related injuries each year (Van Yperen et al.; unpublished data). More than half of these patients are treated at a specialized burn center [11].

This was a retrospective multicenter cohort study. Potential participants were selected from two trauma regions: Southwest Netherland Trauma Region and Network Emergency Care Brabant. All 22 hospitals, including one specialized burn center, two level 1 trauma centers, one specialized eye hospital, and 18 general hospitals, participated. Potential participants were identified from the Dutch National Trauma Registry (NTR). This registry collects data of trauma patients admitted or transferred to a hospital within 48 h after their injury. Data were collected from patient's hospital records. These records were reviewed by DTVY, LHTN, and ACP. This study was exempted by the Medical Research Ethics Committee Erasmus MC (Rotterdam, the Netherlands; registration number MEC-2019-0144).

2.2. Participants

All patients admitted to a hospital in the abovementioned trauma regions, with burns or inhalation trauma that occurred between January 1, 2014 and December 31, 2018, were eligible for inclusion. Eligible patients were identified by searching the NTR for patients with a registered Abbreviated Injury Scores (AIS) for burns or inhalation trauma (Table A.1). Patients were excluded when information from their medical records in order to determine the adherence to the EMSB referral criteria was missing. Furthermore, patients were excluded when they were transferred from one burn center to another, or when they were transferred to a specialized hospital without a burn center (*e.g.*, a level 1 trauma center). These patients were transferred because of other reasons, overruling the EMSB criteria. For example, transferring a patient from one burn center to another because of a shortage of ICU beds, or transferring a severely burn child to a specialized children's hospital, because local arrangements prescribe to do so. Depending on the hospital admission location, patients were allocated to three groups: (1) patients primarily presented to and treated at a non-burn center (non-burn center), (2) patients primarily presented to a non-burn center and transferred to a burn center for treatment (transferred), and (3) patients primarily presented to and treated at a burn center (burn center). For patients treated at a burn center, a distinction was made between patients directly presented (by *e.g.* the emergency services or general practitioner), and patients transferred from other, non-burn center, hospitals.

2.3. Outcome measures and data collection

The primary outcome measure was the adherence to the Dutch EMSB referral criteria (Table 1). For all patients, the location of hospital admission (non-burn center or burn center) and whether they were transferred from a non-burn center to a burn center was registered. For each patient, the presence of each referral criterion and whether a burn center was consulted for treatment advice was registered. Patients who were not transferred to a burn center and had none of the referral criteria, and patients who were transferred to a burn center and met at least one of the criteria, were considered as

Table 1 – Emergency Management of Severe Burns referral criteria; adjusted for Dutch hospitals [17].

Burns 10% or more TBSA in adults
Burns 5% or more TBSA in children (<16 year)
Full Thickness burns 5% or more TBSA
Burns of functional areas — face, hands, feet, genitals, perineum, or large joints (*i.e.*, shoulder, elbow, knee, and ankle)
Circumferential burns of the neck, chest, or extremities
Electrical burns (high voltage) including lightning strikes
Chemical burns
Burns with suspected associated inhalation injury
Any burn patient with associated trauma or (pre-existing) medical condition that may affect treatment and recovery, or could increase mortality
Burns at the extremes of age — young children (<1 year) and the elderly (≥75 years)
Non-accidental burns
Burns for which the burn mechanism is uncertain in combination with uncertainty about the competence/equipment of the hospital for these types of injuries
Burn wound that show insufficient signs of healing within two weeks

TBSA, total body surface area.

adherent to the criteria. Patients not transferred while meeting the criteria were considered as undertransferred, and transferred patient who did not meet the referral criteria as overtransferred.

2.4. *Statistical analysis*

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25.0 (SPSS, Chicago, Ill., USA). Normality of continuous data was tested with the Shapiro–Wilk test. Missing values were not replaced by imputation. Data were reported following the 'Strengthening the Reporting of Observational studies in Epidemiology' (STROBE) guidelines.

For continuous data, median and quartiles (non-normal distribution) or mean and standard deviation (SD; normal distribution) were reported. For categorical data, number and frequencies were reported. No statistical comparison was made between the groups.

Descriptive statistics were used to report the outcome measures. Overall adherence to the referral criteria was determined by plotting the presence of a referral criterion against the admission location. The number and rate of (in) appropriately admitted and (in)appropriately transferred patients will be calculated, for both the whole set of criteria combined as for the individual criteria. No statistical comparison was made between groups.

3. Results

3.1. *Patient selection*

A total of 1807 patients were treated at a hospital from the study region and registered in the NTR. For the analysis, 17 patients were excluded; 10 were transferred from a burn center to another burn center and seven were transferred to a specialized non-burn center. A total of 1790 patients were included in this study (Fig. 1).

Fig. 2 provides an overview of the admission locations of the included patients. A total of 951 (43.9%) patients were primarily presented to a non-burn center. Of them, 35 (3.7%) were transferred to a burn center outside the study region, 14 (1.5%) to the outpatient clinic of the assigned burn center in the study region, and 374 (39.3%) were clinically admitted to the burn center in the study region. Of the patients primarily presented to a non-burn center, 528 (55.5%) patients also received their final treatment at a non-burn center.

A total of 1213 patients were treated at a burn center, of whom 514 (42.4%) were directly presented there. Three hundred seventy-four (30.8%) patients were transferred from a non-burn center within the study region, and 325 (26.8%) patients were transferred from a non-burn center outside the study region that did not participate in this study.

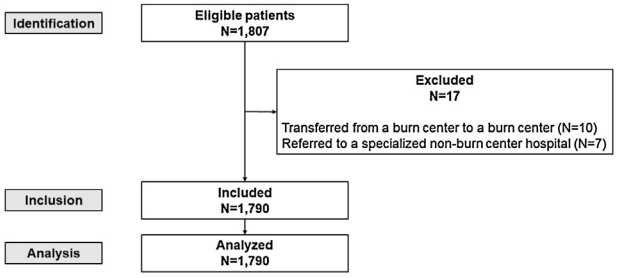

Fig. 1 – Study flow chart.

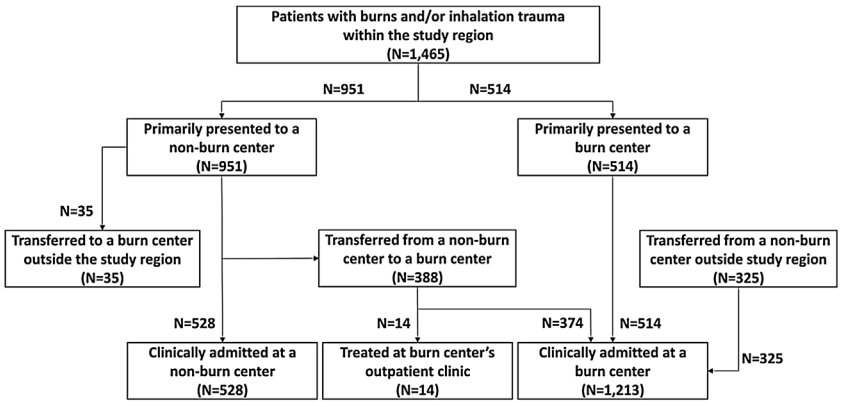

Fig. 2 – Admission location of the included patients.

3.2. *Presence of the EMSB referral criteria*

Of the 951 patients presented to a non-burn center, 668 (70.2%) met the referral criteria. Of the 528 patients who received their treatment at a non-burn center, 265 (50.2%) met at least one of the referral criteria. Of the 423 patients transferred, 403 (95.3%) patients met at least one of the criteria (Fig. 3A). Both groups mainly had burns located at functional body areas.

Of the 1213 patients admitted to a burn center, 1119 (92.3%) met at least one of the referral criteria. Of the 514 patients who were directly presented to a burn center, 457 (88.9%) met one or more criteria and of the 699 patients who were transferred, 662 (94.7%) met one or more criteria (Fig. 3B). These two groups mainly had burns located at functional body areas.

3.3. *Adherence to the EMSB referral criteria*

Fig. 4A shows that, of the 951 patients primarily presented to a non-burn center, 666 (70.0%) patients were managed according to the referral criteria. Two hundred sixty-three (27.7%) of these patients were appropriately not transferred and 403 (42.4%) patients were appropriately transferred to a burn center. Of the 285 (30.0%) patients who were not managed according to referral criteria, 20 (2.1%) were transferred while not meeting any of the criteria and were deemed as over-transferred. The remaining 265 (27.9%) were not transferred while meeting at least one of the criteria, and were deemed as undertransferred. In 101 (38.1%) of these patients a burn center was consulted for treatment advice. Consensus for not referring was reached, and none of the patients underwent transfer or further consultation at a later stage. In the majority of patients, the burn wounds of these 101 patients was caused by flames (n = 52), scalds (n = 33), or chemical burns (n = 11). Seven of the 101 patients had inhalation trauma, and all 101 had burn wounds, with a median TBSA of 4% (P_{25}–P_{75} 1–6%). They were discharged after a median hospital stay of 2 (P_{25}–P_{75} 1–2) days.

For each individual criterion the adherence rate was determined (Fig. 4A). The lowest adherence rate was found in patients with electrical burns. Only four (14.3%) of these patients were appropriately transferred. In case there was any doubt about the burn mechanism or the hospital's treatment facilities, only one (33.3%) patient was appropriately treated, however, this criterion occurred in only three patients. Furthermore, of the 38 patients with chemical burns, 16 (42.1%) patients were appropriately transferred. All non-transferred patients with electrical burns (n = 24) or chemical burns (n = 22) had burn wounds with a median TBSA burned of 0.5% (P_{25}–P_{75} 0,1–0,5%) and 1% (P_{25}–P_{75} 1–2%), respectively. They were admitted for a median of 2 (P_{25}–P_{75} 2–2%) and 2% (P_{25}–P_{75} 2–4%) days, respectively. In all other criteria, an adherence rate of more than 50% was found. The highest adherence rate was observed for the criterion '≥5% total body surface area (TBSA) burned in children' (N = 109; 83%).

Fig. 4B shows adherence in patients with any of the referral criteria (overall) as well as in patients with different numbers of criteria. This figure shows that the adherence to the referral criteria was lower in patients with ≥1 criterion than in the total group; 60.3% *versus* 70.0%. The adherence rate was higher in patients with two or more criteria (69.3%) and with three or more criteria (80.9%), but was lower in patients with for or more criteria present.

4. Discussion

The aim of this study was to determine the adherence to the EMSB referral criteria in burn patients treated at a hospital with or without a specialized burn center, and to determine whether specific criteria were followed less or more strictly. The main findings were that, the overall adherence to the referral criteria was 70.0% for patients presented to a non-burn center. Two hundred sixty-three (27.7%) of these patients were appropriately not transferred and 403 (42.4%) were appropriately transferred to a burn center. Of all patients admitted to a burn center, 92.3% were adherent to the criteria. Adherence was lowest for electrical burns and chemical burns, and highest for '≥5% TBSA burned in children'.

Only a few previous studies have investigated the adherence to referral criteria in burn patients. Differences in study design, referral criteria applicable, outcome measures, and definition of adherence complicates comparison between studies. The highest adherence rates were found in a burn centers in

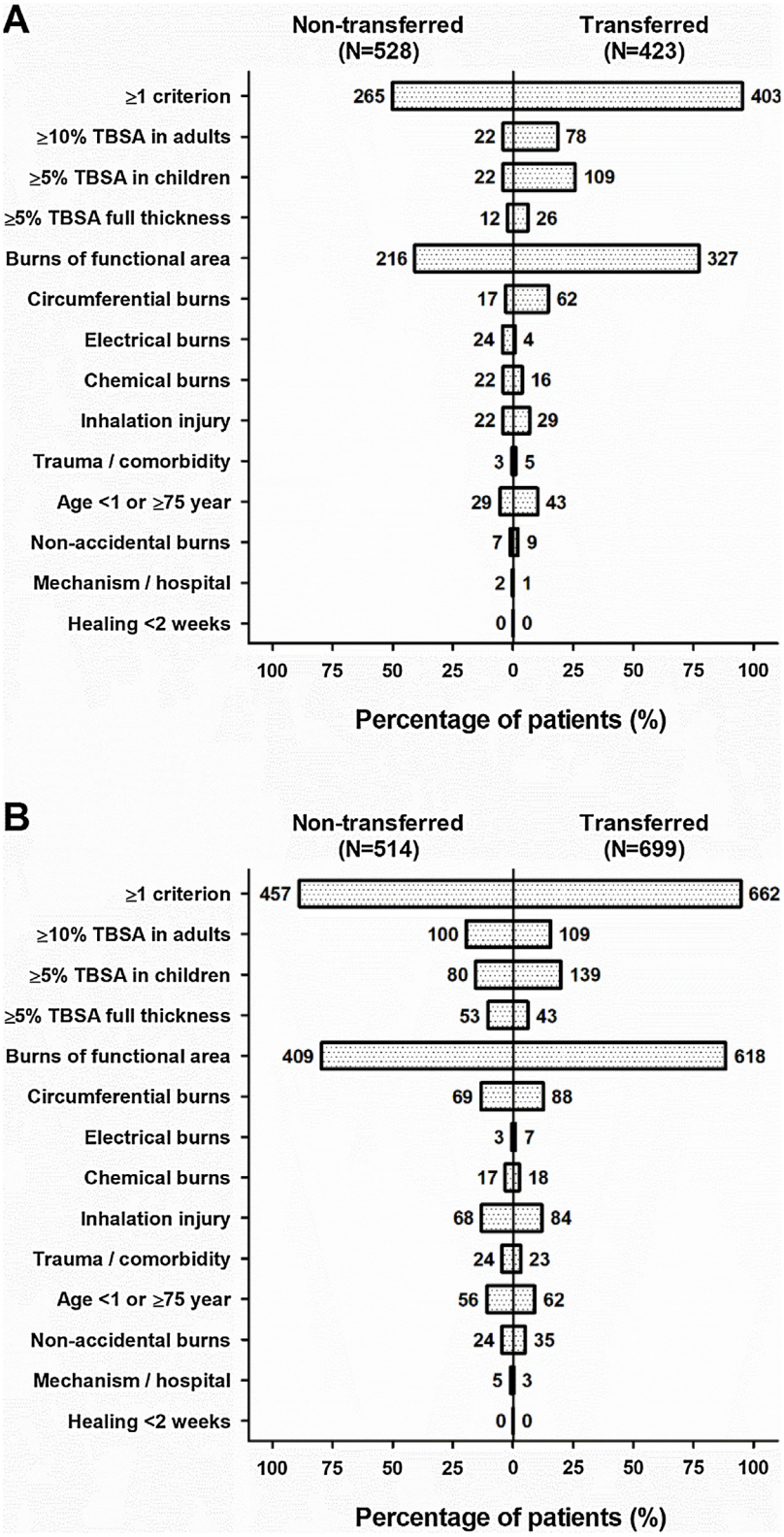

Fig. 3 – The number of patients who met the referral criteria.
This figure shows the number and percentage of patients who met with the referral criteria, for patients primarily presented to non-burn centers (A) and patients treated at a burn center (B).

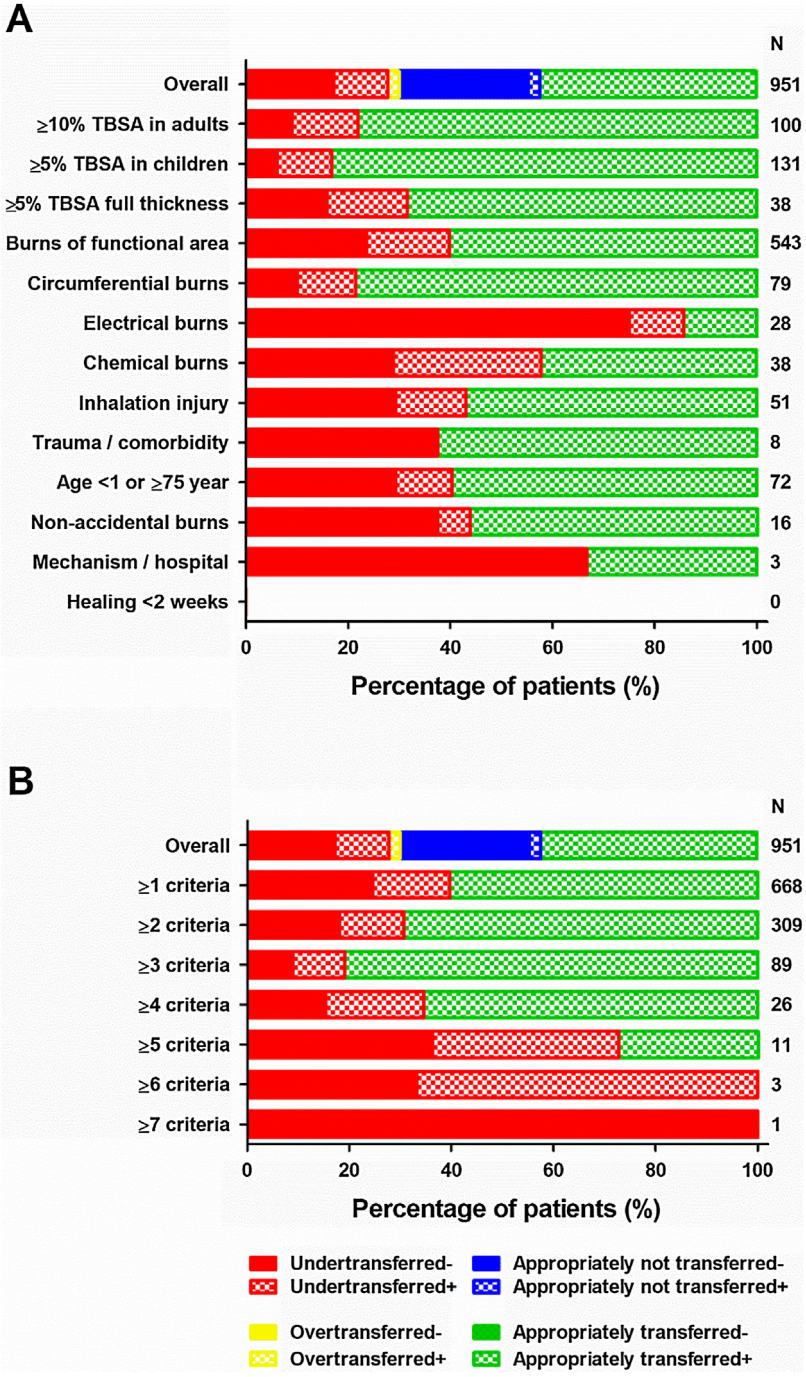

Fig. 4 – The adherence to the EMSB referral criteria.
This figure shows the adherence of patients with any the referral criteria (overall) and with each individual criterion (A), and the adherence in patients with different numbers of criteria (B).
'+' Indicates that a burn center was consulted.

South-Africa (namely 93.4%) [12] and the USA (88% adherence for adults) [8]. Despite assumed differences in the (supra) regional organization of general trauma and burn care, these adherence rates are comparable with the results of the current study (92.3%). Nevertheless, of all patients admitted to a burn center in the USA only 70% of the children met the referral criteria [13]. From their data, it seems like clinical judgement has overruled the referral criteria, since 860 out of 1274 (67.5%) had 10% TBSA burned. In the national burn center in Denmark, 70% of all the patients were appropriately referred [14]. Differences in referral criteria and organization of hospital care may explain this difference. The Danish study used European criteria, which include 1% full thickness or 3% partial thickness burns as criteria, whereas the EMSB uses 5% full thickness burns as

criterion. Other studies investigated the adherence rate of patients presented to a non-burn center. Davis et al. reported for the USA that 54.0% of the patients were not referred while meeting one of the referral criteria [9]. This percentage is higher than the 30% in the current study, which may be explained by differences in referral criteria, distance to a burn center, in taking family preference into account, and insurance status. Rose et al. found that only 17.4% of the pediatric patients were appropriately referred to a burn unit that was located within the same hospital [7]. A clear reason for this low percentage compared with the adherence rate of 50.2% found in the current study cannot be given. However, Rose et al. mention as possible reason for their large underreferral that many patients had small (<5%), superficial partial-thickness burns, and that (84%) of these patients were brought back to follow-up within the ED without specialist input.

Furthermore, 265 (27.9%) patients primarily presented to a non-burn center were not referred although they met the referral criteria. Most improvement in adherence rate for individual criteria could be achieved in patients with chemical and electrical burns, and to a lesser extent in patients with inhalation injury and burns located at functional areas. Given the relatively low prevalence of especially chemical and electrical burns, the effect on improved adherence for the criteria on overall adherence will be limited. Currently, the clinical consequences of underreferring patient with any of these injuries remains unclear. Rose et al. reported no significant increased morbidity in the underreferred patients on a short-term [7]. However, they did not investigate the long-term consequences, nor did they evaluate individual criteria. Baartmans et al. reported that 20% of the pediatric burns center patients were incorrectly referred regarding burn size, resulted into 16% unnecessary fluid resuscitations [10]. For criteria with proven clinical consequences, improved awareness is of benefit in order to increase the adherence rate. Criteria with limited or no clinical consequence may benefit from adjustment or can even be omitted. Results from an ongoing prospective cohort study investigating treatment and outcome of burn patients in hospitals without burn center might provide relevant information regarding this topic [15].

In 38% of the undertransferred patients, a burn center was consulted. Although the distance between burn centers and non-burn center hospitals in the Netherlands is relatively small, consultation by telephone provides a good alternative for referring a patient to a burn center. In particular patients with minor burns can be primarily treated at a non-burn center hospital with the support of a specialized burn center. A nationwide network of burn telemedicine may help optimizing burn care provided at a non-burn center [16].

4.1. *Strengths, limitations, and implications*

A strength of this study is the large number of patients included whom are described in detail. With approximately 1800 patients included, this study is one of the largest studies performed regarding this topic. This study also clearly described where a patient was treated, and whether (not) transferring a patient was adherent with the referral criteria. Furthermore, adherence to the referral criteria in this study was based on information from patient's medical records and not restricted to information from a database.

A limitation of this study is the retrospective study design. Inherent to such a design is that some data were incomplete. In some cases this complicated the interpretation of the adherence to the referral criteria. In a few cases it was also not possible to retrieve data about consulting a burn center. It is unclear from the patient files if the treating physicians decided not to transfer the patient because of arguments or 'forgot' to do so, *e.g.*, due to limited knowledge of the referral criteria. As far as cases in which the treating physician considered advanced care as absent, the most likely reasons would be limited burn injury severity, sufficient expertise and facilities at the non-burn center, misinterpretation of the EMSB referral criteria (especially for inhalation trauma), the patient being moribund, or the decision was made after consulting a burn center. In particular when deviating from the referral criteria insight into the reason would have been interesting information. Furthermore, interpreting the presence of inhalation injury was difficult in this study because information about confirming the diagnosis was lacking. Finally, the current study does not provide details about the functional consequences of patients with referral criteria who were not transferred to a burn center. Results of the prospective study mentioned above might provide relevant information regarding this topic [15].

The results of this study can help in improving the referral patterns of burn patients presented at non-burn center hospitals. Not all of the referral criteria are rigid and some must be interpreted while taking clinical assessment of a patient into consideration. Whether or not amending certain referral criteria or educating physicians at the non-burn centers will improve the adherence rate requires additional research. The adjusted criteria should be more capable of identifying patients in need of specialized care.

5. Conclusion

The overall adherence of patients presented to a non-burn center was fairly high. However, still more than a quarter of patients was not transferred while meeting the criteria. In only the minority of these patients a burn center was consulted for treatment advice. Of the patients admitted to a burn center, nearly all patients met the referral criteria. Highest adherence rate was found in 'children with ≥5% TBSA burned', and most improvement in adherence rate can be achieved in patients with electrical and chemical burns.

Declaration of interest

None.

Author's contribution

The study was developed by DTVY, EMMVL, MHJV, CHVDV, and MEVB. Data was collected by DTVY, LHTN, and ACP. DTVY

and EMMVL performed data analysis and drafted the manuscript. DTVY, EMMVL, MHJV, CHVDV, MEVB, DB, AYMVPC, PARDR, DDH, MG, WAJJM, TMALK, KWWL, LMSJP, ANR, MS, LVDS, BJMT, AHVDV, FCVE, PVVE, BJP, DIV, MW critically revised the manuscript and approved the final version to be submitted.

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Appendix A.

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Appendix B. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.burns.2021.02.023.

REFERENCES

1 Spronk I, Polinder S, van Loey NEE, van der Vlies CH, Pijpe A, Haagsma JA, et al. Health related quality of life 5-7 years after minor and severe burn injuries: a multicentre cross-sectional study. Burns 2019;45:1291–9.
[2] www.ameriburn.org. [Last accessed on 14 January 2021].
[3] https://www.britishburnassociation.org/wp-content/uploads/2018/02/National-Burn-Care-Referral-Guidance-2012.pdf. [Last accessed on 14 January 2021].
[4] https://anzba.org.au/care/referral-criteria/. [Last accessed on 14 January 2021].
[5] Australian and New Zealand Burn Association Referral Criteria. 2012.
[6] Chipp E, Walton J, Gorman D, Moiemen NS. Adherence to referral criteria for burns in the emergency department. Eplasty 2008;8:e26.
[7] Rose AM, Hassan Z, Davenport K, Evans N, Falder S. Adherence to national burn care review referral criteria in a Paediatric Emergency Department. Burns 2010;36:1165–71.
[8] Carter JE, Neff LP, Holmes JH. Adherence to burn center referral criteria: are patients appropriately being referred? J Burn Care Res 2010;31:26–30.
[9] Davis JS, Dearwater S, Rosales O, Varas R, Quintana OD, Pizano L, et al. Tracking non-burn center care: what you don't know may surprise you. J Burn Care Res 2012;33:e263–7.
[10] Baartmans MG, Van Baar ME, Boxma H, Dokter J, Tibboel D, Nieuwenhuis MK. Accuracy of burn size assessment prior to arrival in Dutch burn centres and its consequences in children: a nationwide evaluation. Injury 2012;43:1451–6.
[11] Dokter J, Vloemans AF, Beerthuizen GI, Van der Vlies CH, Boxma H, Breederveld R, et al. Epidemiology and trends in severe burns in the Netherlands. Burns 2014;40:1406–14.
[12] Boissin C, Hasselberg M, Kronblad E, Kim SM, Wallis L, Rode H, et al. Adherence to referral criteria at admission and patient management at a specialized burns centre: the case of the Red Cross War Memorial Children's Hospital in Cape Town, South Africa. Int J Environ Res Public Health 201714:.
[13] Doud AN, Swanson JM, Ladd MR, Neff LP, Carter JE, Holmes JH. Referral patterns in pediatric burn patients. Am Surg 2014;80:836–40.
[14] Reiband HK, Lundin K, Alsbjorn B, Sorensen AM, Rasmussen LS. Optimization of burn referrals. Burns 2014;40:397–401.
[15] Van Lieshout M, Van Yperen DT, Van Baar ME, Polinder S, Boersma D, Cardon AY, et al. Epidemiology of injuries, treatment (costs) and outcome in burn patients admitted to a hospital with or without dedicated burn centre (Burn-Pro): protocol for a multicentre prospective observational study. BMJ Open 2018;8:e023709.
[16] Blom L. mHealth for image-based diagnostics of acute burns in resource-poor settings: studies on the role of experts and the accuracy of their assessments. Glob Health Action 2020;13:1802951.
[17] The Education Committee of the Australian and New Zealand Burn Association. Emergency management of severe burns (EMSB) course manual, Dutch version. Dutch Burn Foundation; 2009.