APPROVED DOCUMENT

Ministry of Health

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Acronyms:

A&E	Accident and Emergency
TBSA	Total Body Surface Area
ECG	Electrocardiogram
GCS	Glasgow Coma Scale
G6PD	Glucoes-6-Phosphate Dehydrogenase
ABSI	Abbreviated Burn Severity Index
MRSA	Methicillin-resistant Staphylococcus aureus
MDR	Multi Drug Resistant
GP	General Practitioner
DNS	Dextrose Normal Saline
IV	Intravenous
PCV	Packed Cell Volume
CVP	Central Venous Pressure
CBC	Complete blood count
RFT	Renal function test
LFT	Liver function test
G6PD	Glucose-6-phosphate dehydrogenase
CRP	C reactive protein
HIV	Human immunodeficiency virus

National Guideline for the Management of Burns in Oman

1. Introduction

Burn is a systemic injury and not just a skin injury. Burn care has developed over the years with the result of increasing in survival rate. The pathophysiology of burns is complex. An important part of the pathophysiology is fluid extravasation which can lead to shock. Inhalation injury can cause airway compromise. The management of burns start at the time of injury. Knowledge of the basic pathophysiology and the initial management of burns is essential for all the doctors, nurses and paramedical staff who may be the first attendant of the burn victims. In order to deliver a high standard care and to reduce the mortality of these patients, protocols and guidelines should be followed strictly.

2. Scope

This guideline applies to all physicians, nurses and paramedics who are involved in the management of burns in governmental and private sector.

3. Purpose

3.1 To have a standard and up to date approach to manage the burn injury.

3.2 To use a systematic approach using primary and secondary survey.

3.3 To reduce morbidity and mortality.

3.4 To ensure that the patient is getting the proper care while he/she is waiting to be transferred to the nearest burns unit.

4. Definitions

4.1 First Degree (Epidermal) Burns: These burns involve the epidermis only and basically it is an erythema.

4.2 Superficial Second Degree (Superficial Dermal) Burns: These burns involve the epidermis and part of the dermis. The features are: Pink in colour, blanching, painful, normal sensation, hair cannot be plucked easily, and blisters may be present.

4.3 Deep Second Degree (Deep Dermal) Burns: These burns involve the epidermis and most of the thickness of the dermis. The features are: Red and white in colour, not blanching, reduced sensation, and hair is easily plucked.

4.4 Third Degree (Full Thickness) Burns: These burns involve the full thickness of the skin. The features are: Leathery in appearance, no sensation, and fixed pigmentations.

4.5 Inhalation Injury: Damage to the airways, lungs and systemic toxicity due to smoke inhalation (usually in a closed space), inhalation of gases or steam.

4.6 Superficial burns: First degree and superficial second degree.

4.7 Deep burns: Deep second degree and full thickness burns.

4.8 Minor burns: Superficial burns involving less than 10% TBSA.

4.9 Central burns unit: Is the tertiary care burns unit and burns intensive care unit which is located in Khawlah hospital.

4.10 Peripheral burns unit: A burn unit located in peripheral hospitals i.e., in Salalah (Sultan Qaboos) hospital, Sohar hospital, Nizwa hospital, Sur hospital...etc.

5. Assessment of burns patient

5.1 On arrival to the nearest health care institution, time of burns and weight of the patient should be recorded and the patient should undergo primary and secondary survey.

5.2 Primary survey comprises the following steps:

5.2.1 Airway assessment:

Airway compromise can happen in case of inhalation injury and burns to the face and neck. Clinical findings that suggest airway compromise include singed facial hair, carbonaceous sputum, soot in or around the mouth, hoarseness, stridor, increased work of breathing, and inability to tolerate secretions.

5.2.2 Breathing and ventilation:

After securing the airways adequacy of breathing and ventilation should be examined. Circumferential third degree burns around the chest or neck can compromise the ventilation.

5.2.3 Circulation and cardiac status assessment:

5.2.3.1 Vital signs recording and observing signs of hypovolemia.

5.2.3.2 Limbs perfusion assessment as full thickness circumferential burns may compromise the vascularity.

5.2.3.3 ECG and cardiac enzymes should be done in case of electrical injury in addition to other investigations that are routinely done for burns patient.

5.2.4 Disability, neurologic deficit and gross deformity:

Glasgow Coma Scale (GCS) recording taking into account that the patient may have associated injury, substance use, hypoxia, or inhalation injury.

5.2.5 Exposure:

5.2.5.1 All cloths to be completely removed.

5.2.5.2 Examination for associated injuries should be done.

5.2.5.3 A warm environment should be maintained when the patient is exposed.

5.2.6 Assessment of the total burns area should be done using Lund and Browder chart (Appendix A).

5.3 Secondary survey should include head to toe examination. It should be done after completing the initial management of the patient (see section 6).

5.4 Abbreviated burn severity index (ABSI) should be recorded. It is an indicator of patient prognosis (Appendix B).

6. Initial management

6.1 Airway:

Immediate prophylactic intubation must be done for suspected inhalation injury and burns to the face and neck after arrival of the patient to the accident and emergency department and after assessment by anaesthetist.

6.2 Breathing:

Escharotmy should be done (Appendix C) for full thickness circumferential burns of the chest or neck because it may impair respirations.

6.3 Management of circulation and cardiac status should include:

6.3.1 Insertion of peripheral or central line.

6.3.2 Fluid resuscitation using crystalloids to prevent / treat burns shock (Appendix D).

6.3.3 Escharotomy of limbs if there are full thickness circumferential burns (Appendix C). Escharotomy may also be needed if there is significant oedema after resuscitation.

6.3.4 Fasciotomy in case of compartment syndrome.

6.3.5 Insertion of urinary catheter for monitoring urine output.

6.4 Anaelgesia for the relief of pain using a stat dose of morphine or infusion. A suggested infusion protocol is in (Appendix E).

6.5 Tetanus immunization status should be evaluated, and immunization given according to the national guidelines.

6.6 Ophthalmologist has to see the patient if there are facial burns.

6.7 Heparin/ N-acetyl cysteine nebulization should be given for inhalation injury (Appendix F).

6.8 Rhabdomyolysis can happen with high voltage electrical injuries. To prevent renal failure mannitol and sodium bicarbonate should be given and high urine output should be maintained (Appendix G).

6.9 Any associated injury should be assessed and treated by the respective department.

6.10 Use of prophylactic systemic antibiotics in burns is controversial. Minor burns do not require prophylactic antibiotics unless there are signs of infection.

7. Burn Wound Management

7.1 First aid management of the burns is copious irrigation of the burns with cold water (ideally 15 degrees Celsius) for at least 20 minutes. Ice should not be used as it may cause further damage. Chemical burns require prolonged irrigation for up to two hours. The endpoint of chemical burn irrigation is when the pain is reduced or litmus paper test is neutral. (If hypothermia develop, irrigation should be withheld). If the chemical is in powder form, it should be brushed first.

7.2 Wound dressing:

7.2.1 In the first 48 hours dressing should be done using Paraffin gauze (Jelonet) and saline soaked gauzes irrespective of the depth of burns.

7.2.2 Subsequent dressing should be as follow:

A. Superficial burns to be dressed with modern burns dressings (synthetic or biological). If not available, then paraffin gauze (Jelonet) and saline soaked gauzes.

B. Deep burns dressing should be done using paraffin gauze (Jelonet) and Silver Sulphadiazine (Flamazine) till the patient is taken for surgery. If the patient is G6PD deficient, Flamazine should not be used.

8. Patients Transference to Burns Unit

8.1 Minor superficial burns can be managed as an outpatient under the care of primary care or A&E physicians.

8.2 Major burns should be initially transferred to the nearest hospital or burns unit.

8.3 Criteria for transfer to a burns unit:

8.3.1 Burns >10% TBSA.

8.3.2 Deep second degree (deep dermal) and third degree (full thickness) burns of any size in any age group.

8.3.3 Burns involving face, hands, feet, genitalia, perineum or major joints.

8.3.4 Burns with Inhalation injury.

8.3.5 Electrical burns.

8.3.6 Chemical burns.

8.3.7 Circumferential burns.

8.3.8 Burns with significant comorbidities.

9. Role of the Central Burn Unit

9.1 All burns patients admitted to a government or a private hospital should be registered on the national burn registry at the central burns unit in Khawlah hospital.

9.2 The peripheral burns units may communicate with the central burns unit for guidance and advice.

9.3 The central burns unit will receive major burns patients who cannot be managed at the peripheral burns units as well as admitting patients from the capital area and nearby areas.

10. Pre-Requisite for Transfer to the Central Burn Unit

10.1 The patients should not be transported from the periphery to the central burns unit during shock treatment which may take a minimum of 48 hours.

10.2 The patients can be transferred to the central burns unit after stabilization and adequate resuscitation.

10.3 Unstable patients must be stabilized first before transferring them to the central burns unit in Khawlah hospital.

10.4 MDR and MRSA screening tests results should be available before transferring the patients to the central burns unit.

10.5 Transfer should be arranged through the bed manager after approval of the burns unit doctors.

11. Baseline Investigations

11.1 CBC

11.2 RFT

11.3 LFT

11.4 Coagulation profile

11.5 Sickling

11.6 G6PD status

11.7 CRP

11.8 HIV

11.9 Hepatitis profile

12. Responsibilities

12.1 Hospital Directors and head of departments shall:

12.1.1 Circulate the guideline to all the doctors, nurses and paramedics.

12.1.2 Make sure doctors / nurses/ paramedics are completely aware and understand the guideline.

12.1.3 Instruct all the doctors / nurses / paramedics to follow the guideline for the initial management of burns.

12.2 Doctors / Nurses / Paramedics shall:

12.2.1 Know and understand the guideline.

12.2.2 Follow the guideline strictly.

12.2.3 Contact the central burns unit at Khawlah hospital for advice if any issue needs to be clarified.

13. Document History and Version Control

Version	Description	Review Date
01	Initial Release	February 2022
~~02~~	Second release	December 2025

14. Related documents:

There is no related document for this document.

15. References:

Title of book/ journal/ articles/ Website	Author	Year of publication	Page
Total burn care (Book), 5th edition	David Herndon	2018	
ISBI practice guidelines for burn care (Article in Burn journal)	Guidelines committee	2016	953-1021
Handbook of burns Volume 1 (book)	Jeschke, Kamolz, Sjöberg, Wolf	2012	
Respiratory management of inhalation injury (Article in burns journal)	MIcuk, Suman, Herndon	2007	2 – 13
Burn care and treatment (book)	Shahrokhi, Kamolz, Jeschke	2013	
Principles and practice of burn surgery (book)	Barret-Nerín, Herndon	2005	

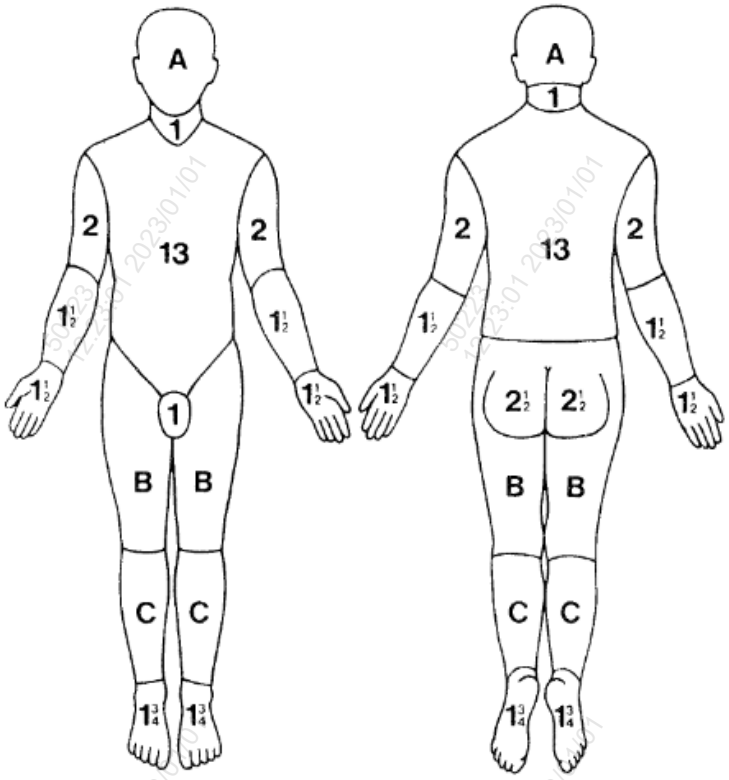
Appendix A: Body Surface Area

NAME _____ WARD _____ NUMBER _____ DATE _____

AGE _____ ADMISSION WEIGHT _____

LUND AND BROWDER CHARTS

IGNORE SIMPLE ERYTHEMA



Partial thickness loss (PTL)

Full thickness loss (FTL)

REGION	% PTL	% FTL
HEAD		
NECK		
ANT.TRUNK		
POST.TRUNK		
RIGHT ARM		
LEFT ARM		
BUTTOCKS		
GENITALIA		
RIGHT LEG		
LEFT LEG		
TOTAL BURN		

RELATIVE PERCENTAGE OF BODY SURFACE AREA AFFECTED BY GROWTH

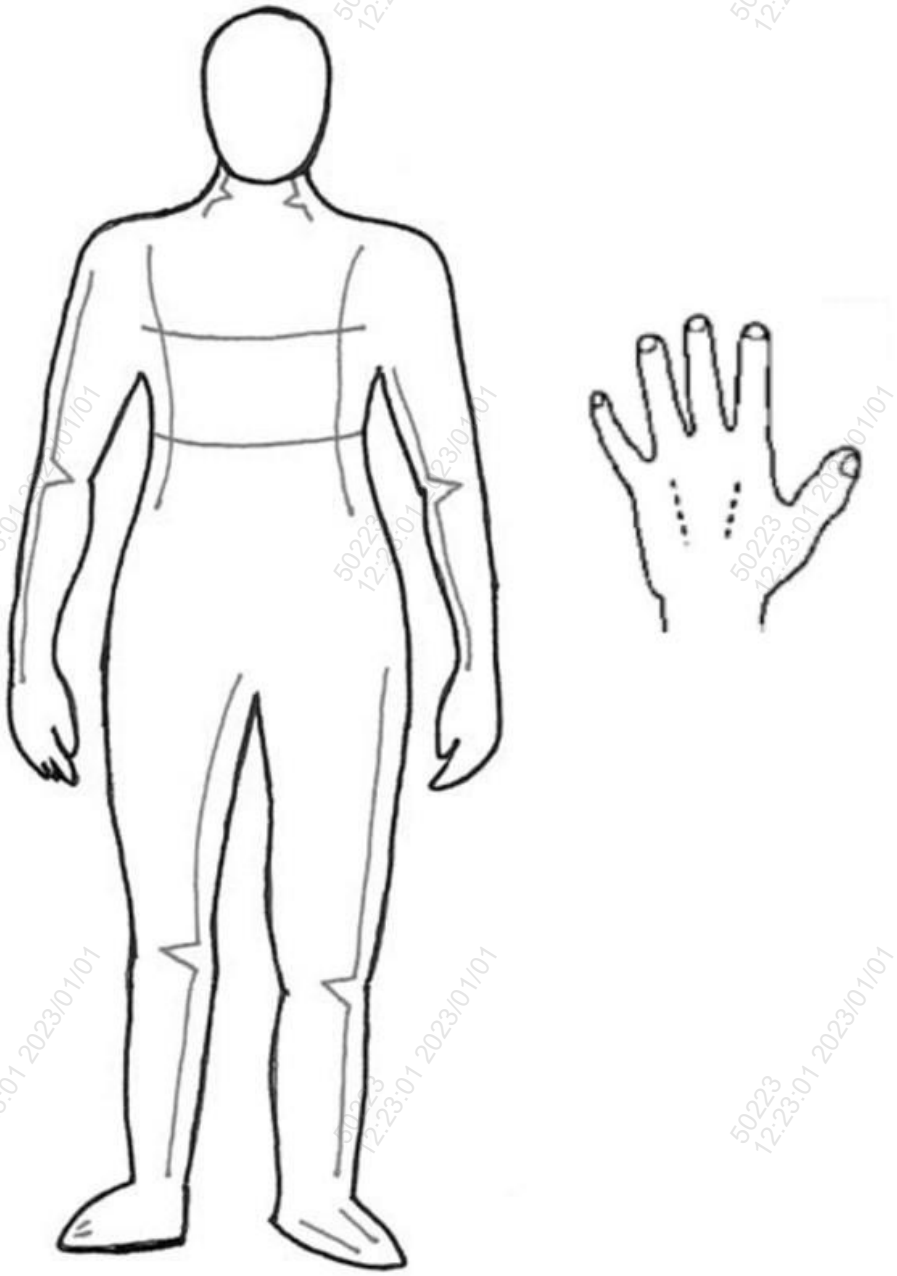
AREA	AGE 0	1	5	10	15	ADULT
A = 1/2 OF HEAD	9 1/2	8 1/2	6 1/2	5 1/2	4 1/2	3 1/2
B = 1/2 OF ONE THIGH	2 3/4	3 1/4	4	4 1/2	4 1/2	4 3/4
C = 1/2 OF ONE LEG	2 1/2	2 1/2	2 3/4	3	3 1/4	3 1/2

Appendix B: Abbreviated Burns Severity (ABSI)

Variable	Patient characteristic	Score
Sex	Male	1
	Female	0
Inhalation injury		1
Full thickness burn		1
Age	0-20	1
	21-40	2
	41-60	3
	61-80	4
	81-100	5
TBSA burned	1-10	1
	11-20	2
	21-30	3
	31-40	4
	41-50	5
	51-60	6
	61-70	7
	71-80	8
	81-90	9
	91-100	10
ABSI score	Threat to life	Probability of survival
2-3	Very low	>99%
4-5	Moderate	98%
6-7	Moderately severe	80-90%
8-9	Serious	50-70%
10-11	Severe	20-40%
12-13	Maximum	<10%

NB. Score can be more than 13

Appendix C: Escharotomy Incisions



Appendix D: The Shock Period Management Protocol

During the **first 24 hours** post burns, **Ringers Lactate/Hartmann's Solution** to be given according to **Parkland formula**:

4mL X % of burns X body weight in Kg
Half of this amount to be given during the **first 8 hours**.
The other **half** to be given over **16 hours**.

PPF (5% albumen) can be given as additional resuscitation fluid according to patient response.

Maintenance IV fluids to be given in addition to the resuscitation fluid for **children**.

The above **formula is not rigid**, adjustments to be done according to the urine output, pulse, blood pressure, PCV value, CVP measurement and the clinical picture of the patient.

Urine output is the main **indicator** of adequacy of resuscitation. It should be **0.5 ml/kg/h for adults** and **1 ml/kg/h for children**.

Fluid resuscitation after the first 24 hours will depend on the clinical condition of the patient.

Under resuscitation and **over resuscitation** have negative effects on the patient and both can cause **complications.**

Appendix E: Morphine Infusion Protocol

To be given on admission of acute burns and post operatively.
The patient should be monitored in burns unit or high dependency area.

Infants:
< 3months old – do not give
>3 months old – 0.25mg/kg/24hours

Children:
<30kg- 0.5mg/kg/24hours
>30kg-0.75mg/kg/24hours

Adults:
< 45 years old – 1mg/kg/24hours
> 45 years old – 0.5mg/kg/24hours

Example:

A patient requires 50 mg of morphine for 24 hours. If using (10mg/ml) ampoule, then 5ml will be prepared. This will be added to 19 ml of normal saline to make a total of 24ml. This will be infused at rate of 1 ml/hour using infusion pump.

Appendix F: Inhalation Protocol for Adults and Children

All the cases of suspected inhalation injury or with head and neck burns should be assessed in A&E by the anaesthetists.

Prophylactic intubation should be done in A&E for all the cases of suspected inhalation injury and cases with head and neck burns.

All cases of inhalation injury should receive the following:

1. Nebulised Heparin 5000 IU diluted with 3 mls of normal saline 4 hourly for 5 to 7 days.
2. Nebulised 20% Acetylcystine solution 3 mls diluted with 3 mls of normal saline every 4 hours (should be discontinued if bronchospasm develops).
3. Alternative nebulisation, so patient receives 2 hourly treatments.
4. Nebulised Salbutamol 2.5 to 5 mg 4 hourly if wheeze is present.

Appendix G: Rhabdomyolysis Protocol for Adults

Urine with a color darker than light pink:

1. Two ampoules of mannitol (25 g) given IV push.
2. Followed immediately by two ampules of sodium bicarbonate, also given IV push.
3. Urine output to be maintained above 100 ml/ hr.

Khoula hospital burns unit contact numbers:

Direct: 22501460, 22501507.

Through switch board: 22501000 extension 1507.

Burn on call doctor: 72722537