

Management of Severe Burns for Acute Surgeons



C O U N T I E S
M A N U K A U

H E A L T H

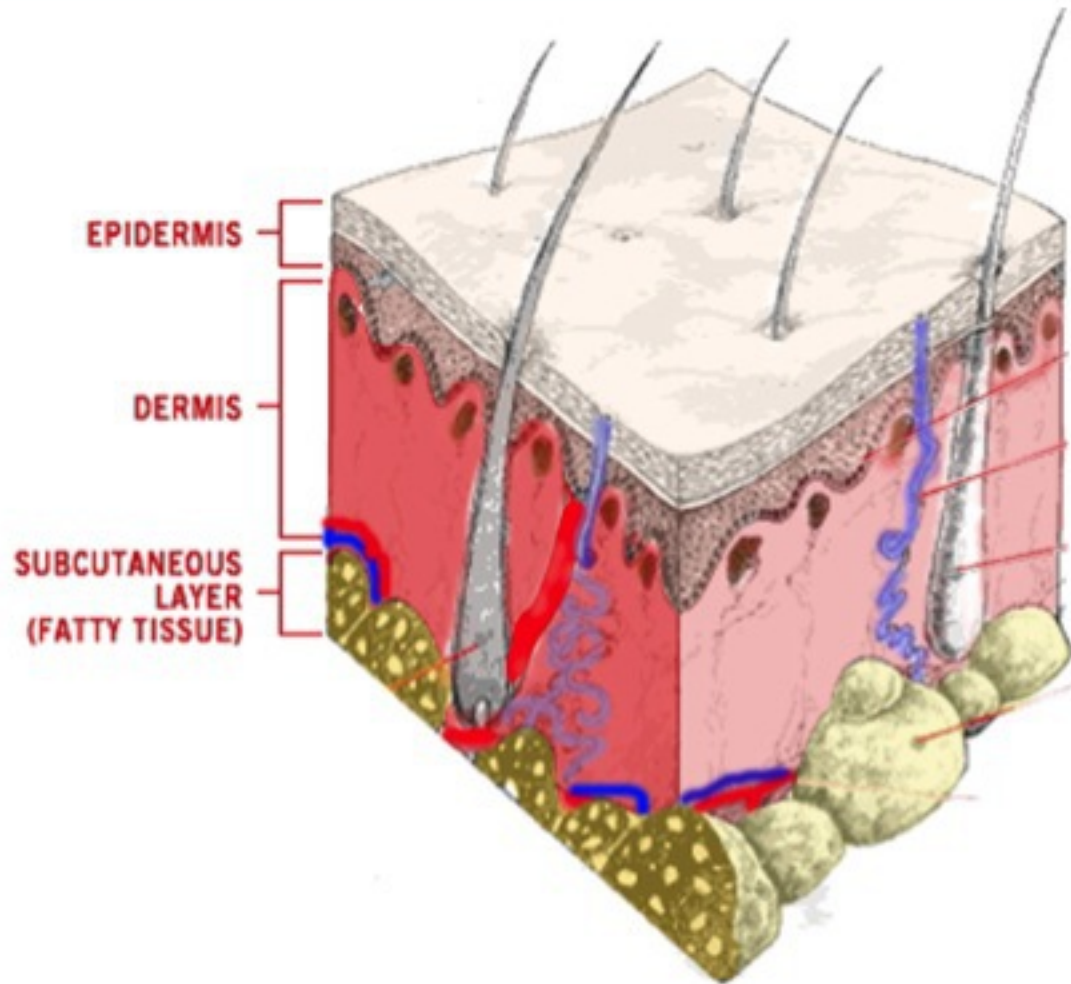
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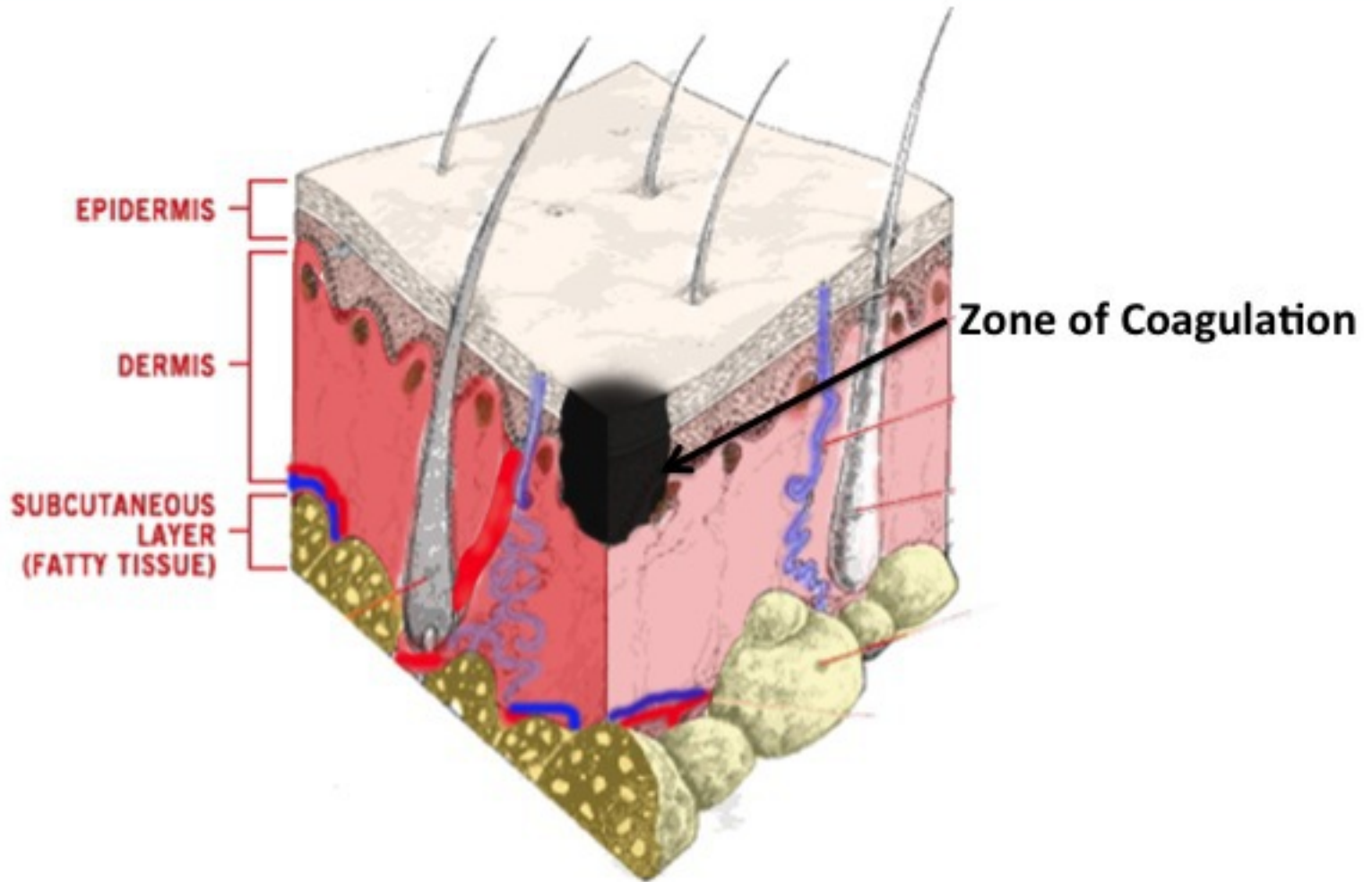
Introduction

- What is a 'severe' burn?
 - recognition & significance
- What do I need to do?
 - role of the trauma surgeon in emergent treatments
- What are the outcomes?
 - is it worth it?

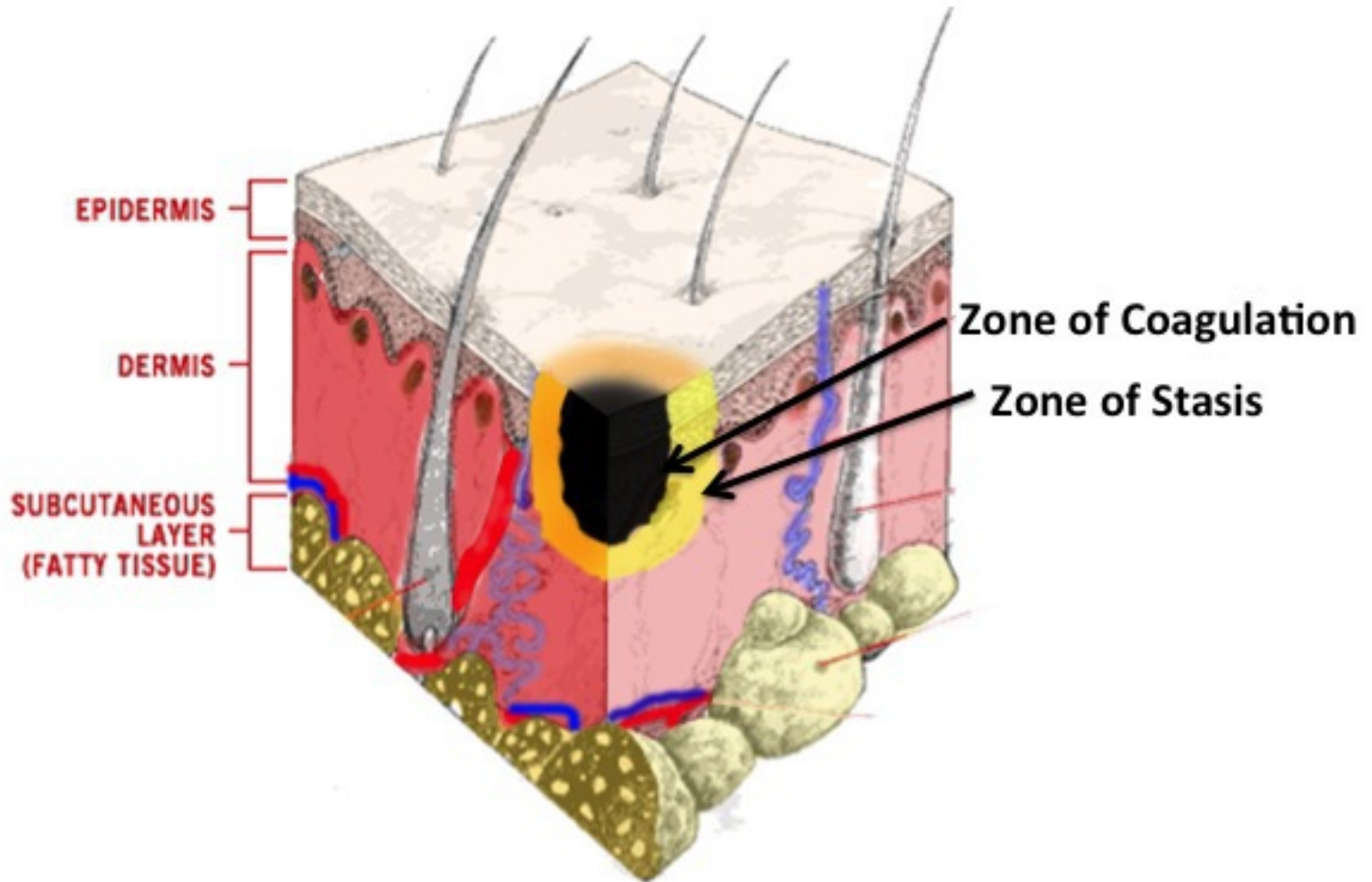
What is a Severe Burn?



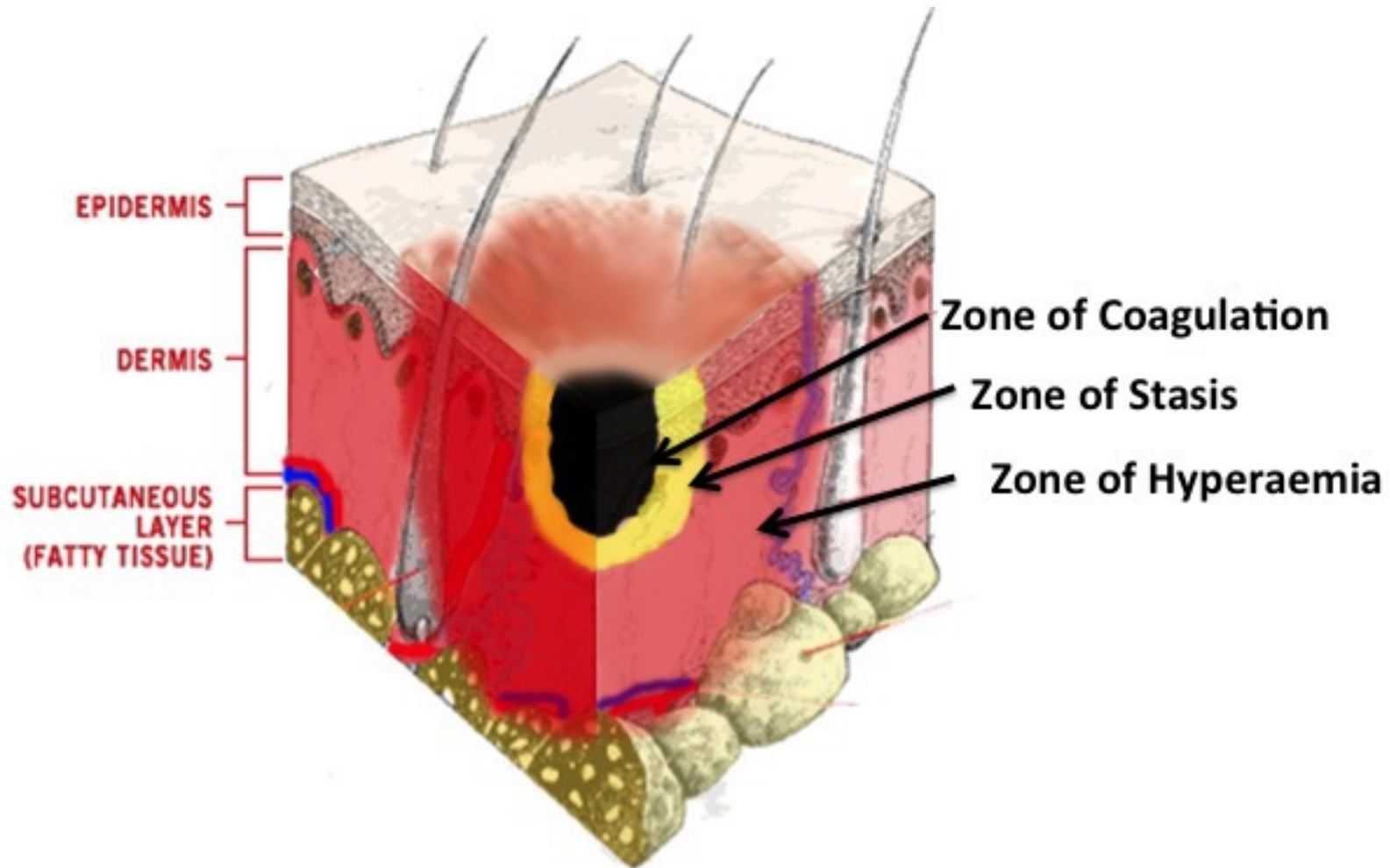
Jackson's Burn Wound Model



Jackson's Burn Wound Model



Jackson's Burn Wound Model



What is a Severe Burn?

- Any burn on me
- A 'big' burn on anyone else
 - how 'big' is 'big'?
 - sometimes very obvious

What is a Severe Burn?

- Any burn on me

- A 'big' burn on anyone else
 - how 'big' is 'big'?
 - sometimes very obvious
 - sometimes deceptive

What is a Severe Burn

- Severe = >20–25% TBSA
 - effect of burn becomes **systemic**
- Inflammatory mediators cause
 - vasodilation
 - capillary permeability changes
 - *fluid loss from circulating volume*
 - *paradoxical swelling extravascularly*

Words of Wisdom

“ It may not happen
overnight...
but it will happen ”

PANTENE
PRO-V



What is a Severe Burn

- Severe = >20–25% TBSA
 - effect of burn becomes **systemic**
- Takes time to manifest
 - partly driven by resuscitation fluids
 - ***predictable problems***

- Modified Parkland Formula
 - 3–4ml / kg / % TBSA
 - $\frac{1}{2}$ in first 8 hours from burn
 - subsequent $\frac{1}{2}$ over 16 hours

- Balanced salt solution
 - *Hartmann's*
 - *Lactated ringers*
 - *Plasmalyte*

Fluid Resuscitation

- Modified Parkland Formula
- $3 \times 80 \times 30 = 7,200 \text{ ml}$
 $= 3,600 = 450 \text{ ml/hr first 8 hours}$
 $= 225 \text{ ml/hr subsequent}$
- Output of $0.5 \text{ ml/kg/hr} = 960 \text{ ml/d}$
- *6,240 ml positive balance*



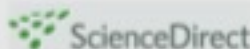
- Least amount of fluid to
 - maintain tissue perfusion
 - maintain vital physiological functions
- Returning physiology to normal is impossible
- Goal = ***prevention*** of burn shock

Fluid Resuscitation

BURNS 34 (2008) 1090–1097



available at www.sciencedirect.com



journal homepage: www.elsevier.com/locate/burns



Increased fluid resuscitation can lead to adverse outcomes in major-burn injured patients, but low mortality is achievable

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ABSTRACT

Background: Excessive fluid resuscitation of large burn injuries has been associated with adverse outcomes. We reviewed our experience in patients with major burn injury to assess the relationship between fluid, clinical outcome and cause of variance from expected resuscitation volumes as defined by the Parkland formula.

Methods: Eighty patients with new burns $\geq 15\%$ total body surface area (TBSA) admitted to the intensive care unit within 48 h of injury were included.

Results: Mean fluid volume was 6.0 ± 2.3 mL/kg/% TBSA at 24 h. Bolus fluids for hypotension and oliguria explained 39% of excess variance from Parkland estimates and inaccurate burn size and weight assessment explained 9% of variance. Higher fluid volume was associated with pneumonia [adjusted odds ratio (AOR) = 2.0; 95% confidence interval (CI) 1.2–3.4] and extremity compartment syndrome (AOR = 7.9; 95% CI 2.4–26). Colloid use during the first 24 h reduced the risk of extremity compartment syndrome (AOR = 0.08; 95% CI 0.007–0.49) and renal failure (AOR = 0.11; 95% CI 0.014–0.82). In-hospital mortality was low (10%) and not associated with $>125\%$ Parkland resuscitation ($P = 0.38$).

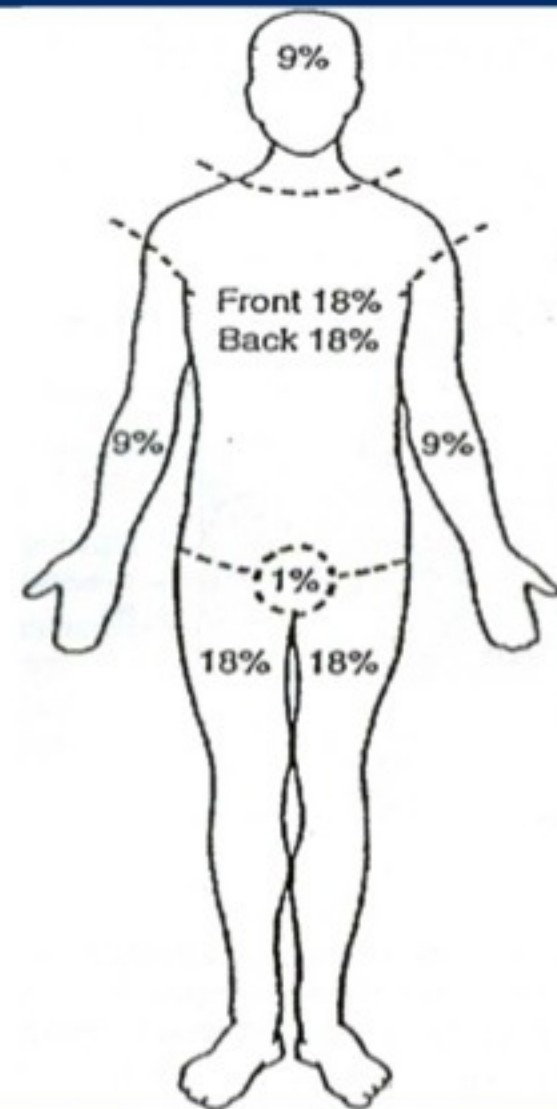
Conclusions: Although fluid resuscitation in excess of the Parkland formula was associated with several adverse events, mortality was low. A multi-centre trial is needed to more specifically define the indications and volumes needed for burns fluid resuscitation and revise traditional formulae emphasising patient outcome. Improved training in burn size assessment is needed.

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Burn Assessment

- Size
 - rule of 9's
- Depth
 - dermal injury only
 - blistered skin
 - ***blisters can take time to form***
- ***Burn size to resuscitate to can change with time***



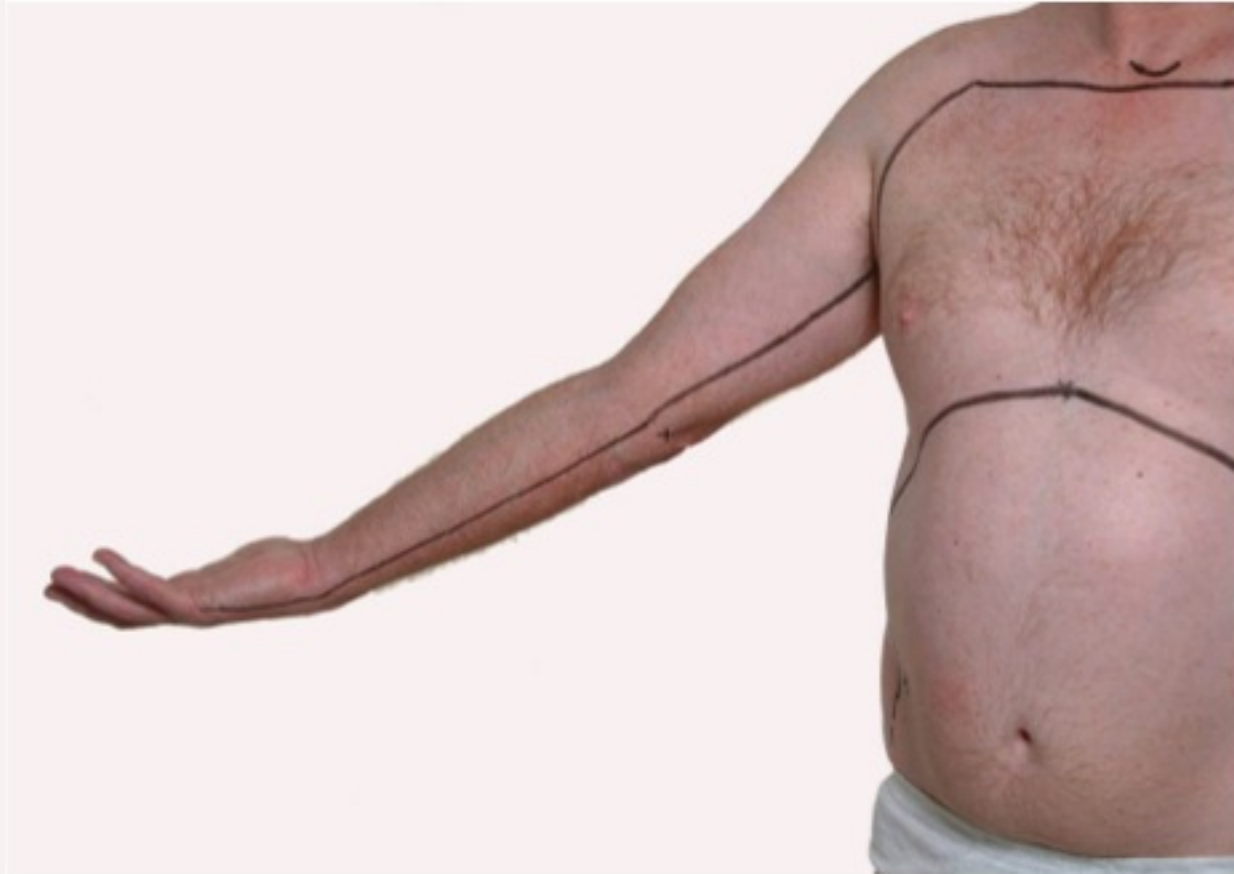
What do I need to do?

- TRAUMA!
 - golden hour
- Burn injury
 - ply-wood 8
 - slow BUT relentless
- *Escharotomy*



- Surgical release of rigid eschar to allow...
 - respiration if around chest
 - circulation if around limb
- Typically full-thickness circumferential burn
 - can be deep-dermal
 - can be near circumferential
- ***Takes time to develop***
 - driven by fluid resuscitation

Escharotomy



Escharotomy



- Only through eschar, down to fat (not fascia)
 - diathermy
 - minimum incisions for maximal benefit
 - 'mid-axial' lines in limbs

- Adequate when
 - restore ability to ventilate if chest
 - restore circulation in limb

What do I need to do?

- Haemochromogens

- extensive deep burns / high voltage electrical injury
- protect kidneys by 'flushing' / driving urine output
- *identify underlying cause*

- Fasciotomy

- release muscle compartments



What do I need to do?

- Liaise with Regional Burn Unit
 - may require transfer to National Burn Centre
 - may not be possible immediately

- Agreed
 - referral criteria
 - channels of communication
 - clinical pathways

- contingency plans
- funding streams

Referral Criteria

- Initial criteria developed from mixture of clinical & financial
- Currently all clinical *& flexible*



New Zealand National Burn Service

Referral Pathway to National Burn Centre

Referral to National Burn Centre:

1. RBU consultant confirms that burn meets criteria for referral to NBC.
2. Referring doctor completes referral form. (<http://www.nationalburnservice.co.nz/pdf/referralform.pdf>)
3. Referral faxed to NBC Fax: 09-276-0114 and referring consultant rings On-Call Burn Nurse: 09 2503800.
4. Email clinical photographs to oncallburnsnurse@middlemore.co.nz
5. On-Call Burn Nurse will arrange conference call with referring consultant and NBC consultant.
6. On-Call Burn Nurse will coordinate all communication with RBU consultant, ICU and NBC.
7. RBU and referring consultant will be informed of Decline/Accept decision within 2 hours of receipt of faxed referral.

On-Call Burn Nurse: 09 2503800

NBC Fax: 09-276-0114

Email: oncallburnsnurse@middlemore.co.nz

NBC Referral Criteria:

- Burns greater 30% TBSA.
- Full thickness burns to face, hands, feet, genitalia, perineum and/or respiratory tract.
- High voltage electrical burns.
- Significant chemical burns.
- Or any other burn that the RBU consultant feels would benefit from transfer to NBC.



www.nationalburnservice.co.nz

Referral Criteria

- Not directly
 - access via normal channels
 - via local R.B.U.
- Internal pathways to move and redistribute patients



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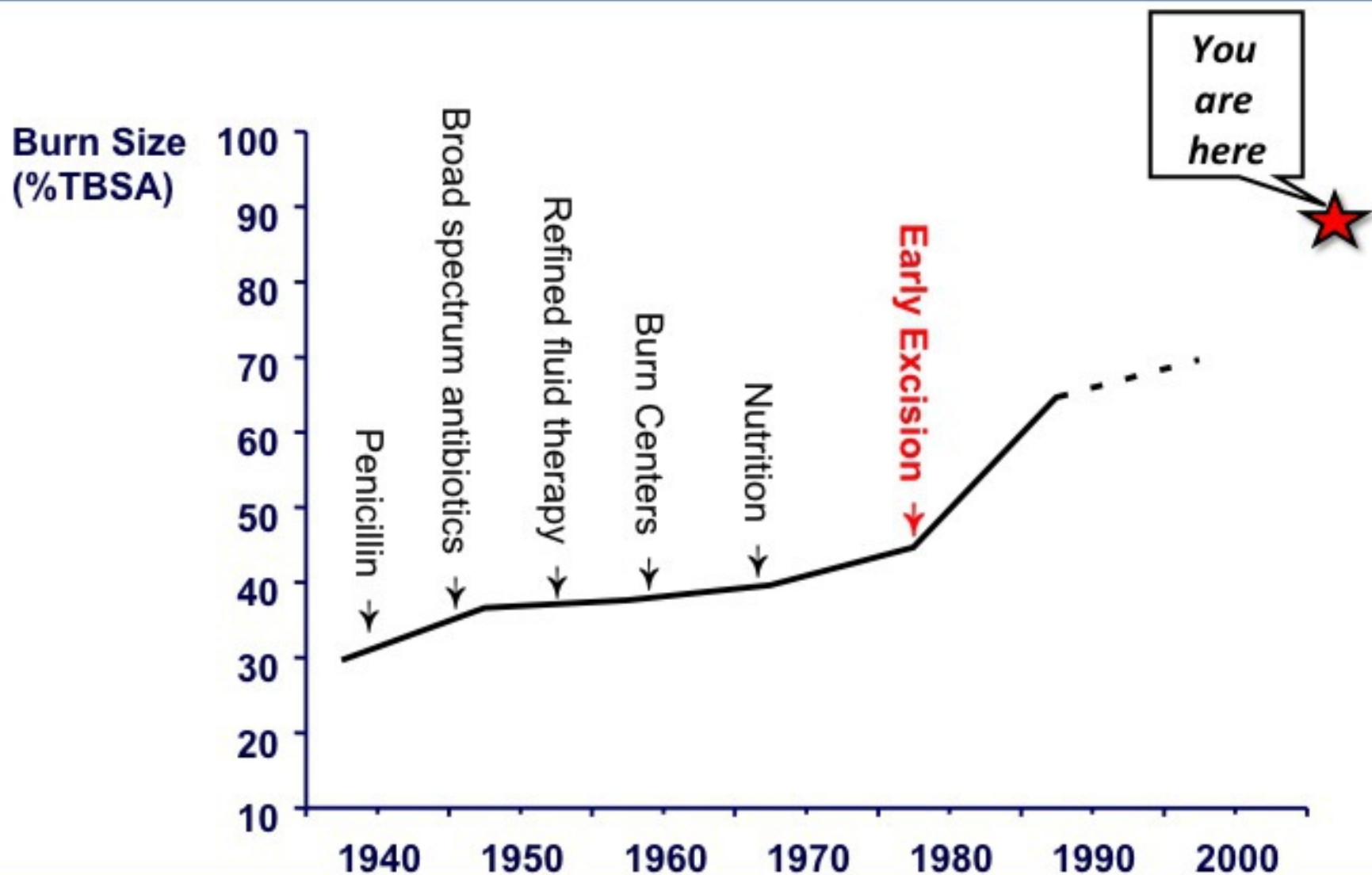


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What are the outcomes?

- LD50 currently around 80% TSBA
 - relatively routine survival for 'fit & healthy'
60-70% TBSA
- Goal is return to independent living
 - majority of burn patients achieve this
- **Outcomes are entirely dependent on good initial care**

What are the outcomes?



What are the outcomes?

Bay of Plenty Times



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'I owe my life to Bay doctor'

By Carly Udy | 16th July 2009

For any new father the company of a doting baby daughter doesn't get much better - especially when you've had to wait six months to hold her in your arms.

It's one of life's pleasures Barrie Gardner will never take for granted again after nearly losing his life in an explosion in 2007. The blast left him with burns to 80 per cent of his body.

At the time, daughter Tahlia was eight weeks old and, because Mr Gardner was so badly injured, it was more than six months before he could hold his daughter unaided.

His injuries were among the worst doctors who treated him had seen in 10 years.

Amazingly today, 21 months on, the 30-year-old looks more like the man he once was and getting on with life albeit "one day at a time".



GIANT STEP: Barrie Gardner was unable to hug his daughter Tahlia for six months after he was badly burned