SURGICAL MANAGEMENT OF UPPER LIMB HIGH VOLTAGE ELECTRIC BURNS: LITERATURE REVIEW, TREATMENT ALGORITHM, 4 CASES SERIES IN LILLE UNIVERSITY HOSPITAL
INTRODUCTION

• 3 to 6% of admissions in the Burn Unit
• Upper limb: 70%
• Severe functional sequelae: 1/3 of cases
• Complex management
• No guidelines concerning acute surgical management

Aim: comparing initial management, time before first trimming, mean number of trimmings, time before loss of tissue coverage

Treatment algorithm
EPIDEMIOLOGY

• Young man
• Workplace injury 2/3
• High voltage > 1000 V
• « Volts can burn, Amperes can kill »

internal passage  electric arc  electric flash
PHYSIOPATHOLOGY

MISMATCH BETWEEN APPARENT LESIONS / REAL DAMAGE

- Macro thrombosis
- Evolutive microthrombosis
- Burn
  - Compartment syndrome
  - Evolutive myonecrosis
- Burn
  - Neurapraxia
  - Ischaemia
MATERIAL & METHODS

• Literature review: pubmed « electrical » « injury » « burn » « upper limb » « hand » « surgery » « fasciotomy »

• Case series: electric burns with severe upper limb function impairment

• Collected datas: time before first trimming, number of surgical trimmings, time before loss of tissue coverage
# RESULTS

<table>
<thead>
<tr>
<th>Patient</th>
<th>First trimming (days)</th>
<th>Number of trimmings</th>
<th>Coverage delay (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D5</td>
<td>3</td>
<td>D15, D35</td>
</tr>
<tr>
<td>2</td>
<td>D1</td>
<td>3</td>
<td>D26</td>
</tr>
<tr>
<td>3</td>
<td>D4</td>
<td>4</td>
<td>D15</td>
</tr>
<tr>
<td>4</td>
<td>D10</td>
<td>3</td>
<td>D21</td>
</tr>
<tr>
<td>Average</td>
<td>D5</td>
<td>3,25</td>
<td>D24</td>
</tr>
<tr>
<td>Mean results in literature</td>
<td>D4-D5 [22]</td>
<td>4 [14]</td>
<td>D 24,2 [15]</td>
</tr>
</tbody>
</table>


CONCLUSION

- Complex management due to pathophysiology of electric burns
- Emergency = muscle and nerve release
- Expandibility = need of successive trimmings
- Coverage should not be performed in the first 3 weeks
Acute surgical care of high voltage electrical injuries to the upper limb

Clinical examination
  Compartment pressure measurement
    > 30 mmHg?
    PAd - P compartment < 30 mmHg?
      Pressure measurement H12, H24
        No
          awake patient?
            No
              clinical supervision
            Yes
          Yes
            systematized sensory or motor loss?
              Yes
                SURGICAL EMERGENCY
              No
                Yes
                  amputation
                    carbonized distal ends
                    extensive myonecrosis
                    life threatening rhabdomyolysis
                Clinical, pulse +/- Ultrasound Doppler
                  macrothrombosis?
SURGICAL EMERGENCY

- Passive / active mobilization
  functional immobilization
  orthosis +/- arthroisis

- Daily dressing of wounds
  asepsis

- Superinfection ?
  - Bacterial sampling + antibiotic

- Surgical debridement / 3-4 days

- Healthy tissue ?
  - Loss of tissue statement +/– vascular CT Scan
  - Yes

- No
Loss of tissue statement +/- vascular CT Scan

vital structures exposure?

No

Thin Skin graft +/- dermal substitute

Yes

+ tenolysis + nerve release

Distant pedicled flap Free flap