雷擊與電擊傷
Lightning and Electrical injury

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Lightning and Electrical injury

Q1. 下列何種雷擊傷害最常發生?

- 1. Direct strike
- 2. Contact injury
- 3. Side splash
- 4. Ground current

A1.下列何種雷擊傷害最常發生?

- Direct strikes are relatively rare, accounting for approximately 5% of lightning strikes involving people.
- Contact injury occurs when a person is touching an object that is struck.
- Side splash accounts for one third of lightning injuries.
- Ground current accounts for nearly half of lightning injuries.

Q2. 電擊傷後 CPR?

- 1. 叫ABC叫
- 2. 叫叫ABC
- 3. 叫CAB叫
- 4. 叫叫CAB

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Q3. Triage?

- 1. 38歲男性，失去意識無呼吸心跳
- 2. 40歲男性，失去意識脈搏每分鐘90下，呼吸30下
- 3. 42歲男性，意識清楚，呼吸26下，心跳90下，但是全身不能動
- 4. 28歲女性，意識清楚，呼吸26下，心跳90下，在一旁哭泣，說耳朵很痛

A3. *Reverse triage*

- 1. 38歲男性，失去意識無呼吸心跳
- 2. 40歲男性，失去意識脈搏每分鐘90下，呼吸30下
- 3. 42歲男性，意識清楚，呼吸26下，心跳90下，但是全身不能動
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Q4. 下列何種電擊最可能致命?

- 1. transthoracic (hand-to-hand)
- 2. vertical (hand-to-foot)
- 3. straddle (foot-to-foot)

A4.下列何種電擊最可能致命?

- Current that traverses the myocardium is more likely to be fatal. A transthoracic (hand-to-hand) pathway is more likely to be fatal than a vertical (hand-to-foot) or straddle (foot-to-foot) pathway. There may be extensive tissue destruction along the current pathway.

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Q5. EMT送來一個病患遭雷擊傷後四肢不能動

- 1. 照 C-spine Xray or CT
- 2. 打高劑量steroid
- 3. 做脊椎穿刺，緊急會診神內
- 4. 這是Keraunoparalysis，拿掉頸圈，沒事的

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Q6.有關電擊傷及閃電擊傷之描述，何者錯誤：

- 1. 閃電電擊是直流電；高壓電是交流電
- 2. 被閃電電擊比較容易造成asystole；相對起來被交流電電到比較容易造成Vf
- 3. 閃電電擊的電壓通常比高壓電強
- 4. 閃電電擊傷比起高壓電，常需要fasciotomy
- 5. 高壓電擊傷比閃電電擊傷更容易造成myoglobinuria

A6.有關電擊傷及閃電擊傷之描述，何者錯誤：

Table 213-1 Comparison of Lightning and Electrical Injuries

Factor	Lightning	High-Voltage AC	L
Current duration	10 microseconds to 3 milliseconds.	Generally brief (1–2 s), but may be prolonged.	0
Typical voltage and current range	10 million to 2 billion V, 10 to 200,000 A.	600–200,000 V, <1000 A.	<
Current characteristics	Unidirectional (DC).	Alternating (AC).	A
Current pathway	Skin flashover; deeper pathways can result in burns.	Horizontal (hand to hand), vertical (hand to foot).	H
Tissue damage	Superficial and minor if no deep tissue pathway.	Deep tissue destruction.	S
Initial rhythm in cardiac arrest	Asystole.	Asystole more than ventricular fibrillation.	V
Renal involvement	Myoglobinuria is uncommon, and renal failure is rare.	Myoglobinuria and renal failure are relatively common.	M
Fasciotomy and amputation	Rarely necessary.	Relatively common.	S
Blunt injury	Caused by explosive shock wave that can throw the person and cause eardrum rupture.	Caused by falls, being thrown from current source, tetanic contractions.	C
Immediate cause of death	Prolonged apnea, blunt injury, deep tissue burns.	Prolonged apnea, ventricular fibrillation, blunt injury, deep tissue burns.	V

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Q7.有關電擊傷及閃電擊傷之描述，何者正確：

- 1. 閃電擊傷因伏特電壓極高，死亡率亦較高
- 2. 閃電擊傷造成大量傷患現場處理，以檢傷分類黑色標籤病患為第一優先
- 3. 靜脈輸液補充之原則對於電擊傷及閃電擊傷之病患是相同的
- 4. 高伏特閃電休克常造成冠狀動脈痙攣(coronary artery spasm)產生心室顫動(VF)而死亡
- 5. 以上皆是

A7.有關電擊傷及閃電擊傷之描述，何者錯誤：

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Q8.有關高能量電擊傷產生之傷害，下列何者較不會發生？

- 1. 皮膚與軟組織之燒燙傷
- 2. 白內障
- 3. 延遲性血管出血
- 4. 骨骼肌肉外傷
- 5. 橫紋肌溶解症

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Q9. 有關電擊傷害的描述，下列敘述何者錯誤？

- 1. 遭交流電擊傷時，如果電流達 **18－30 mA**，即**可能**造成呼吸抑制。
- 2. 遭交流電擊傷時如果電流達到 **70 mA** 以上，即**可能造成心室顫動。**
- 3. 遭高壓電（**600－70,000 volts**）的**交流電電擊傷時，心臟停止的最**初的心律比較常見的是心室顫動。
- 4. 遭閃電電擊傷時，心臟停止的最初心律比較常見的是 **asystole。**
- 5. 高壓電電擊傷比閃電電擊傷較常造成肌球蛋白尿與腎衰竭。

A9.有關電擊傷害的描述，下列敘述何者錯誤？

Table 212-2 Effects of Current

Effect	Current Path	Minimum Cu
Tingling sensation, minimal perception	Through intact skin	0.5–2.0
Pain threshold	Through intact skin	1–4
Inability to let go: tetanic contractions of hand and forearm tighten grasp, decreasing skin resistance	From hand through forearm muscles into trunk	6–22
Respiratory arrest: can be fatal if prolonged	Through chest	18–30
Ventricular fibrillation	Through chest	70–4000
Ventricular standstill (asystole): similar to defibrillation; if current stops, sinus rhythm may resume	Through chest	>2000

Take homemessage

- 1. Muscular paralysis, especially after high voltage, may persist for several hours; ventilatory support is required during this period.
- 2. VF is the commonest initial arrhythmia after high-voltage AC shock; treat with prompt attempted defibrillation. Asystole is more common after DC shock; use standard protocols for this and other arrhythmias.

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Take homemessage

- 3. Remove smouldering clothing and shoes to prevent further thermal injury.
- 4. Consider early surgical intervention in patients with severe thermal injuries.
- 5. Maintain spinal immobilisation if there is a likelihood of head or neck trauma.
- 6. Conduct a thorough secondary survey to exclude traumatic injuries caused by tetanic muscular contraction or by the person being thrown.

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Take homemessage

- 7. Electrocution can cause severe, deep soft-tissue injury with relatively minor skin wounds, because current tends to follow neurovascular bundles; look carefully for features of compartment syndrome, which will necessitate fasciotomy.
- 8. Reverse triage
- 9. Keraunoparalysis

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- Thanks