

## Suicide by low-voltage electrocution

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*In contrast to an earlier series of reports on death caused by low-voltage electrocution which concluded that it was mostly accidental.<sup>(1,2)</sup> We sometime found few reports determined death in a bathtub caused by suicidal with low-voltage electrocution, it is however, the most common form of suicide in U.S.<sup>(3-9)</sup>*

*Not only this review of medical literature confirms the rarity of suicide by electrocution with low-voltage current in Thailand, but it also shows the different process to attempt suicide.*

**Keywords :** *Low-voltage electrocution, Suicide.*

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ในอดีตการเสียชีวิตที่เกิดจากกระแสไฟฟ้าที่มีศักย์ไฟฟ้าต่ำดูนั้น ส่วนมากมักเกิดจากอุบัติเหตุ อย่างไรก็ตามเรายังพบในรายงานจำนวนหนึ่ง ซึ่งแสดงสาเหตุการตายที่เกิดจากการฆ่าตัวตาย โดยกระแสไฟฟ้าศักย์ต่ำดูภายในอ่างอาบน้ำ และเป็นรูปแบบการตายหนึ่งที่พบได้บ่อยในสหรัฐอเมริกา ซึ่งรายงานฉบับนี้ ไม่เพียงแต่เพื่อยืนยันการเสียชีวิตที่เกิดจากกระแสไฟฟ้าศักย์ต่ำ ซึ่งพบได้ไม่บ่อยนักในประเทศไทย แต่ยังแสดงให้เห็นถึงรูปแบบการฆ่าตัวตายที่แตกต่างจากเดิมอีกด้วย

**คำสำคัญ :** การฆ่าตัวตายโดยใช้กระแสไฟฟ้าศักย์ต่ำ, ฆ่าตัวตาย

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จุฬาลงกรณ์มหาวิทยาลัย



### Case report

A Thai middle-aged man was found dead on the 2<sup>nd</sup> floor of his house, lying in prone position. The external examination of the body found bare ends electrical copper-wires tightly tied around his left ankle and his right wrist under which were found with major burn and necrosis of the skin. The electrical wires were connected to a plastic extension cord, the end of which was plugged into a wall-socket of 220 Volts. (Alternative Current).

The muscle rigidity was fully presented and the blood lividity was markedly showed on the face.

Neither disorder nor sign of violence was present; only a doctor visiting card and a plastic insulation sheet stripped off from the electrical wires in the garbage were found. Later we contacted the hospital to take his medical record. The victim had no psychiatric history, only HIV infection was diagnosed.

At the autopsy, the external examination showed 3<sup>rd</sup> degree burn with central necrosis of the skin on the left ankle and the right wrist. The internal examination showed groups of enlarged perihilar lymph nodes; both lungs were markedly congested.

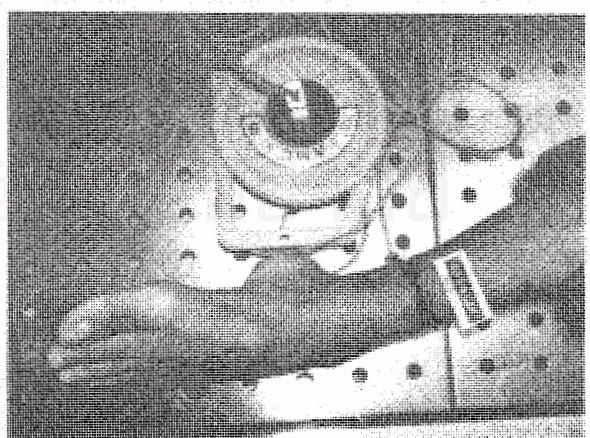
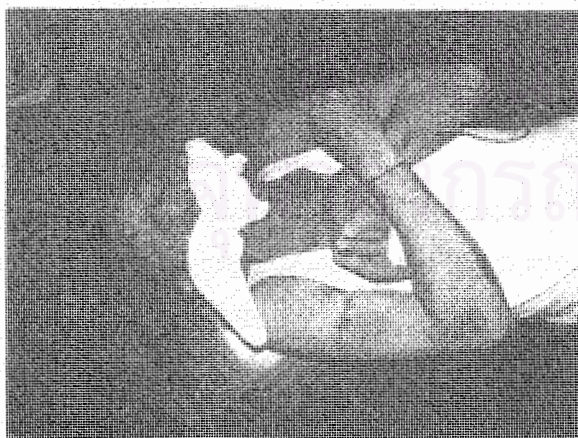


Figure 1-4. Crime scene pictures.



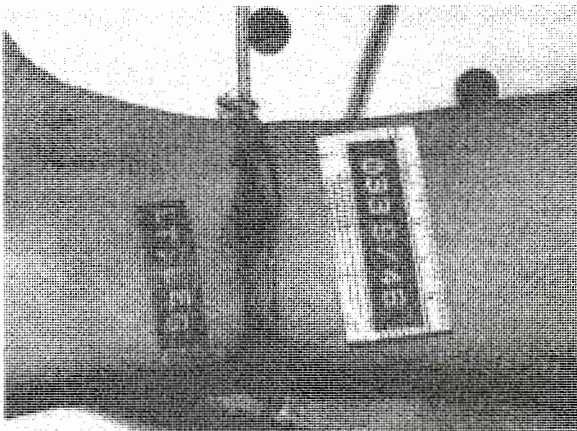


Figure 5-6. External and internal findings.

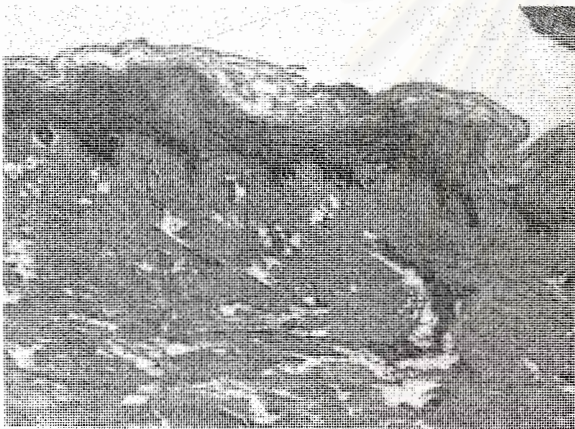


Figure 7-8. The pathological findings show "Streaming nuclei" (from Electro-magnetic effect).

Toxicological screenings for ethanol, amphetamine and opiate groups were negative. But the blood screening for Anti-HIV (ELISA technique) was positive and the lung tissues culture showed heavy growth of *Pseudomonas* spp.

Microscopic examination showed changes of the skin including streaming of epidermal nuclei, microblister formation and vacuolation of the epidermis.<sup>(10)</sup> Other organs were congestion. All these confirmed that the cause of death was electrocution. The manner of death was most likely suicidal.

### Discussion

Suicidal death by low-voltage electrocution is infrequent.<sup>(11-17)</sup> So far, only two cases that have been confirmed by Chulalongkorn Forensic Center since 1999. As we know from pathological findings, there are many factors that cause death and injury, for example the skin resistance, time exposure, type of electricity (AC or DC) and direction of the current flow. The current intensity that causes fatality is about 20-2000 mA. In general, a skin resistance is 40,000 ohms but a resistance of the calloused palm may be



as high as 1 million ohms and that of moist skin as low as 300 ohms. In Thailand, the household uses alternating current with 220 Volts. To calculate, approximately the resistance of the victim's skin is about 110 -11,000 ohms that appropriate for the ventricular fibrillation or asystole of the heart.

The death from low voltage in this case, the victim made contact, creating an electrical circuit passing through his body from an energized source to ground (line to ground). The pathway of the current entry his wrist and passed through the opposite side of his ankle, which reveals he knew something about the physical nature of electricity. From the medical record (the victim had been diagnosed as HIV positive), the autopsy findings and the positive screening result for Anti-HIV (ELISA technique) implied that the motive for the death was suicide.

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