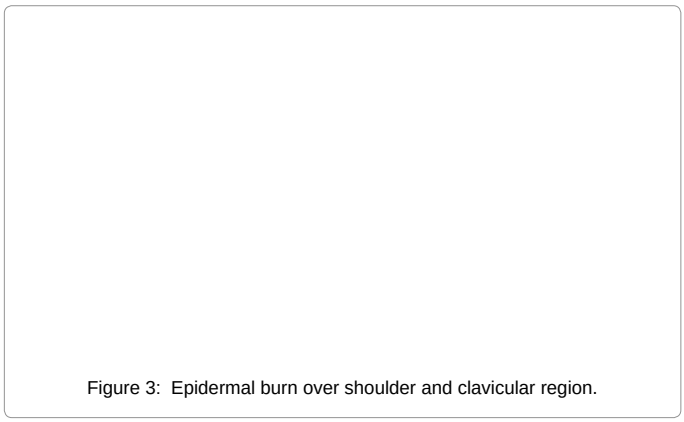

Figure 3: Epidermal burn over shoulder and clavicular region.

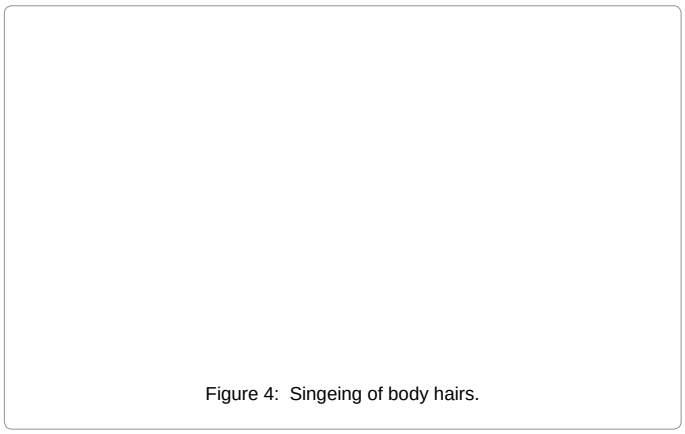

Figure 4: Singeing of body hairs.

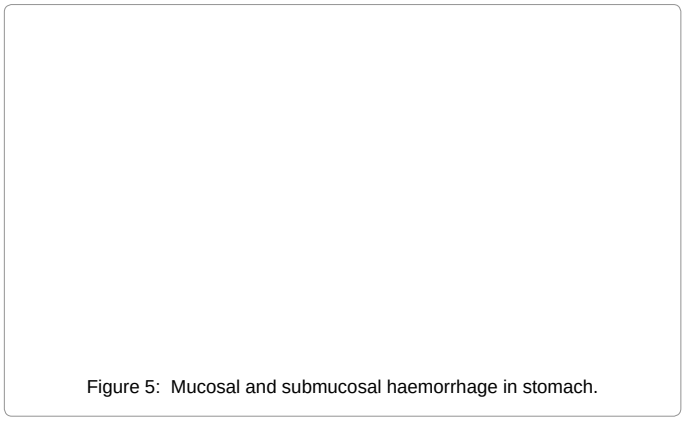

Figure 5: Mucosal and submucosal haemorrhage in stomach.

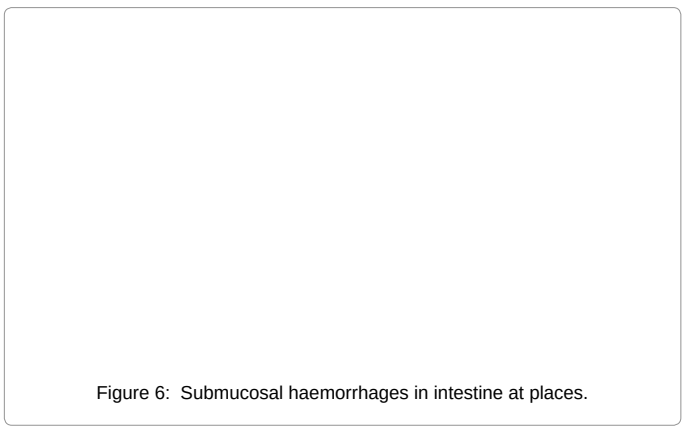

Figure 6: Submucosal haemorrhages in intestine at places.

Discussion

Lightning injuries result from electrical energy, thermal energy or the enormous blast force of thunder lightning strike. e vast majority of lightning injuries are rst – and second –degree burns to the skin covering 1 and 20% of the body. Burns associated with lightning appear in several forms: feathering, linear, punctuate, thermal (from ignition of clothing), contact (from metal objects such jewellery or zippers) and ash [2].

In the present case epidermal burns wound was observed over front of right shoulder near the clavicular region and lower half of back. Singeing of body hairs was seen over lower half of back and buttock along with scorching of the shirt. Also, the victim was working in the agricultural eld in a rainy day. Now about 70% of the lightning deaths occurred in the months of June, July, and August i.e. rainy season. Work-related activities contributed to 13% of the total lightning fatalities. Of which Farming/ranching-related activities contributed most (34%) followed by roo ng (9%), lawn care (9%), construction (9%), military work (6%), barge work (6%) and others (25%) [3].

Shock waves created by the lightning channel causes di erent Injuries. During a lightning strike, in few seconds the channel temperature will be raised to about 25,000 K resulting, the pressure to increase to several atmospheres. e resulting rapid expansion of the air creates a shock wave which can injure a human being located in the vicinity of the lightning ash. e pressure associated with the shock wave decrease with the distance rapidly, so the shock wave can injure a human being located in the much closed vicinity of lightning ash only [4]. About 20-50% of lightning- injured victims su er ruptured tympanic membrane in the ear. In this case, there was bleeding through both ears with otoscopic examination revel perforation of the tympanic membrane. us the deceased might have been in very close vicinity of the lightening strike causing the shock wave to create a blast e ect on the hollow organs like ear to rupture and bleed. During a direct lightning strike to the upper part of the body, the ears can be located within the few centimetres from lightning channel. Calculation by Hill shows that the over pressure within a few centimetres of lightning channel can reach about 10-20 atm. is over pressure creates a sound impulse of about 200 dB which is above the pain threshold level of human hearing, which is about 120 dB. Even if the tympanic membrane remains intact, the victims still may su er from varying degree of permanent hearing loss and “ringing in the ear” (tinnitus) which is probably caused by the damage to hair cells and nerves in cochlea either from shock wave or by the ow of current through it [4].

Explosions cause injury through three principle mechanisms: primary blast injury, secondary injury, and tertiary injury. Primary blast injury is caused by the direct e ect of a blast wave created by an explosion. Primary blast injury has three primary mechanisms. e rst is *spalling*, which occurs when the shock wave (blast wave) transfers from a dense medium (liquid) such as water to a less dense medium (gas) such as air. It causes injury by the tear or re ected blast wave energy through a body dense substrate (liver, muscle) into the less dense material of the gastrointestinal tract and lungs [5]. was mucosal and submucosal hemorrhage in the stomach and intestine in the present case, which may occur as a result of spalling when the shock wave (blast wave) transfer into a less dense medium such as stomach and intestine. Also there were no localized erosions of the mucosal lining of the digestive tract which usually occur in the ulcers of the stomach or duodenum. Breakdown of the mucosal lining results in damage to blood vessels, causing bleeding.

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