Identification of the Vehicle of a Hit-and-Run Accident Based on Patterned Evidence

Munasinghe KR[1]*, Vidanapathirana M[2], Rascon MA[3]

[1]Office of JMO, Ministry of Health, Base Hospital, Elpitiya and Balapitiya, Sri Lanka,
[2]Office of the Dean, Faculty of Medicine, Uva Wellassa University, Sri Lanka,
[3] Office of the El Paso County Medical Examiner, TX, USA

Abstract
Leaving the scene of the traffic crash without reporting is called hit-and-run collision and tracing the alleged vehicle is the main challenge in delivering justice. However, it is not very difficult to trace the vehicle by using Locard's principle when a vehicle leaves trace evidence either on the body/ clothing or scene. Hit-and-run collisions are a punishable offence as they delay crash notification thereby delaying emergency response which increases the likelihood of traffic fatalities. The following case discussion is based on a dead body of a foot cyclist found at a bend on a byroad in a rural area.

He was a 72-year-old carpenter, non-alcoholic, driving an improvised foot cycle run by a motor, which could run up to 40 Kilometres per hour. There was a tire mark on the back side of his shirt. According to the police, the foot cycle had been found fallen on the road without runover injuries. The autopsy revealed multiple blunt force injuries including grazed abrasions on the head, chest, and limbs. Internal organs did not show any significant evidence of natural illness or intoxication. However, there were no paint, grease, glass fragments, etc., or CCTV record evidence. However, a motorcyclist saw a tractor with a trailer stopped beside the victim and the driver was standing by the side and drove off in a while.

The absence of paint or grease on the body suggested that the floorboard of the offending vehicle could be higher. The alleged tractor with the trailer was taken into police custody based on a tipoff. According to the Government analyst's opinion, the tire mark on the shirt was compatible with the tire tread pattern of the right rear tire of the tractor-trailer. The cause of death was multiple injuries to the head and chest due to run-over by a moving vehicle. The importance of examination of clothing in road crashes especially in hit and run is reemphasized in this case.

Keywords: Hit and run, run over, Tractor-trailer.

Received: 21 June 2023, **Revised version accepted:** 20 Dec 2023, **Published**: 31 Dec 2023 ***Corresponding author:**
Munasinghe KR, Email: kanchanarm@gmail.com https://orcid.org/0000-0001-7075-800X

Cite this article as: Munasinghe KR, Vidanapathirana M, Rascon MA. Identification of the Vehicle of a Hit-and-Run Accident Based on Patterned Evidence. Medico-Legal Journal of Sri Lanka, 2023;11(2):32-35 DOI: https://doi.org/10.4038/mljsl.v11i2.7488

Introduction

Leaving the scene of the crash without stopping/reporting is called hit and run collision. It is an offence in most countries including Sri Lanka [1]. Hit-and-run collision is a punishable offence as it delays crash notification thereby delaying emergency response which increases the likelihood of traffic fatality [2]. Tracing the vehicle in a hit-and-run accident is the main challenge in delivering justice. It is further difficult when there are no eyewitnesses or other evidence like CCTV records. However, it is not difficult to trace the vehicle by using Locard's principle when a vehicle leaves trace evidence or tire marks either on the body or on the clothing. It is also easy when the vehicle is heavy as it leaves an expected injury pattern on the body. The following case discussion is based on a dead body of a foot cyclist found in prone position on a bendy road in a rural area.

Case report

The deceased was a 72-year-old carpenter, alleged to have been a non-alcoholic, driving an improvised foot cycle run by a motor, which could run up to 40 kilometers per hour, and was found dead at a bend in a rural road around 7.30 pm. According to the police, the foot cycle had been found fallen on the road without runover injuries. The autopsy revealed multiple blunt force injuries including grazed abrasions on the head, chest, and limbs. Internal

organs did not show any significant evidence of natural illness or intoxication. According to the police, the dead body of a foot cyclist was found in the prone position at the scene.

There were no CCTV evidence, however, a motorcyclist had seen a tractor with a trailer stopped beside the victim and the driver was standing by the side and fled the scene soon after the incident after viewing the body.

At the autopsy, there was an imprint mark resembling to tire on the left side of the back side of his shirt with a tear parallel to the mark (Fig 01). Just below the tear (blue arrow), there were two dark friction marks (Red arrows) on the back of the shirt (Fig. 02). Underneath this tear there were two elongated friction abrasions (Red arrows) situated on the back of his body (Fig 03). However, there were no paint, grease, glass fragments, etc. on the body or on the clothing.

Figure 01. Photograph of the back of the body showing a tire tread mark (Black arrow)

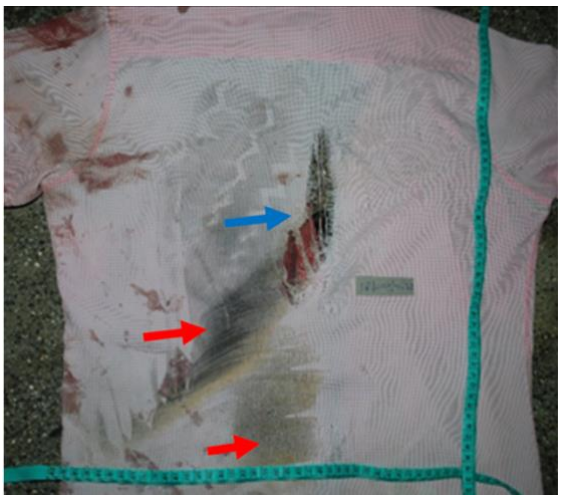

Figure 02. Just below the tear (blue arrow), 02 dark friction marks (red arrow) were found

Figure 03. Two parallel imprint abrasions (red arrows) placed obliquely on the back of the chest

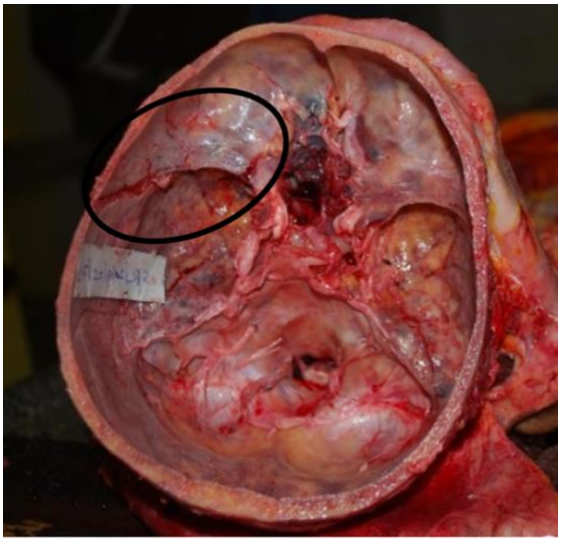

Figure 04. The base of the skull shows the left basal skull fracture indicated by black circle.

The autopsy revealed multiple blunt force injuries including grazed abrasions on the head, chest, and limbs. Left partial hinge fracture (black circle) of the

skull was noted with diffuse subarachnoid haemorrhage on the ventral aspect of both cerebral hemispheres (Fig. 04).

There were two oblique lines of rib fractures situated on the back (paravertebral gutter) and outer aspect (mid-axillary area) of the left chest (Fig. 05) with underlying lung contusions (white arrows) (Fig. 06). However, the internal organ dissections did not reveal any significant evidence of natural illness or the intoxication.

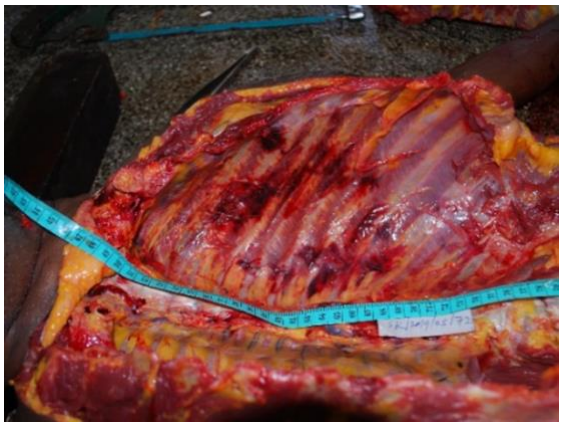

Figure 05. Visceral aspect of the left thoracic cavity showing two oblique lines of rib fractures

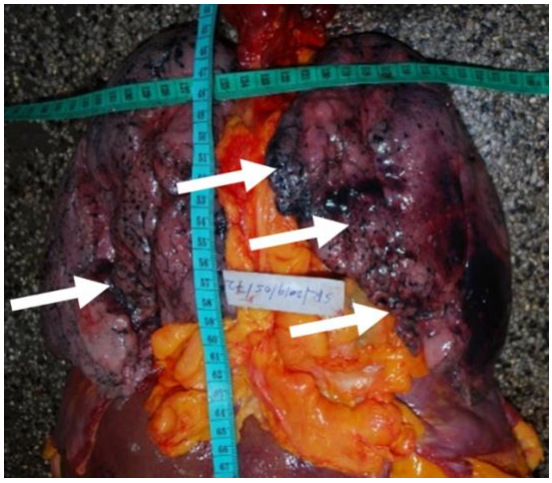

Figure 06. Lungs showing contusions indicated with white arrows

Later, the driver and tractor with the trailer were taken into custody on a tipoff and the driver was a 53-year-old male (Fig. 07).

Figure 07. The tractor with the trailer

Discussion

In this case, a very clear tire mark was situated on the back of his shirt. According to the Government Analyst Department report, the tire imprint (pattern evidence) on the shirt was compatible with the right rear tire of the trailer. Further, the absence of paint or grease on the body suggested that the floorboard of the offending vehicle could be higher.

Presence of foot cycle at the scene and the eyewitness evidence it can be assumed that he was travelling in the bicycle at the time of the incident. In this case, the bicycle did not show impact or runover injuries and the autopsy also did not reveal primary or secondary impact injuries, however, there were secondary injuries and runover injuries. The basal skull fracture of the left side was identified as a part of hinge fractures or motorcyclist's fracture. The presence of hinge fracture and the underlying subarachnoid hemorrhages of the brain are compatible with falling from the foot cycle and knocking the side of his head on the road surface [3]. Further, the presence of multiple grazed abrasions on the head, chest, and limbs further confirmed a fall.

According to the Government analyst's opinion, the tire mark on the shirt was compatible with the tire tread pattern of the right rear tire of the tractor-trailer. In run-over injuries, tire tread marks do not invariably occur, but if they do, it may be on the clothing and or on the skin [4]. The width in between two parallel abrasions on the back of the skin were compatible with the width of the right rear trailer tire and the body gets sandwiched between the road surface and the tire resulting the tire imprint, tear, and friction marks on the shirt, the two abrasions on the back of his body and multiple postero-lateral rib fractures due to a run over by the alleged tractor trailer. The cause of death was given as multiple injuries to the head and chest due to run-over injuries by a moving vehicle.

Hit-and-run crashes are responsible for a number of traffic fatalities. Of the 48,000 pedestrian deaths that were recorded in the United States between 1998 and 2007, 18.1% were caused by hit-and-run crashes [5].

Incorporating median separation and speed humps into road design and construction and installing streetlights will help to curb the problem of pedestrian hit-and-run accidents [6]. In addition, targeted traffic enforcement should be performed especially on weekends and nighttime [2]. However, the effects of road-related factors and harsher legal punishments have limited influence on reducing hit-and-run likelihood after a driver hits a pedestrian [7].

A number of researches have been conducted to identify the pattern of hit-and-run collision types and the drivers involved. A study done in Singapore in 2008 found that drivers were more likely to run away when crashes occurred at night, on a bridge and flyover, bend, on straight road, and near shop houses; involved two vehicles, two-wheel vehicles, and vehicles from neighboring countries; and when the driver was a male, minority, and aged between 45 and 69 [1]. In this case, the driver was a 53-year-old male. The victim was a foot cyclist and the body was found on a bend. Further, in this case, two vehicles were involved and one of them was a two-wheel vehicle.

On the other hand, collisions occurring on undivided roads is less likely to be hit-and-run crashes [1]. However, in this case, the road was an undivided rural road.

Conclusions

The absence of paint or grease on the body suggested that the floorboard of the offending vehicle could have been higher. The importance of examination of clothing in road crashes and the opinion from other stakeholders like Government analyst especially in hit and run is reemphasized in this case.

Disclosure statement

Conflicts of interest: The author declares that she has no conflicts of interest.

Funding: None

References

1. Tay R, Rifaat SM, Chin HC. A logistic model of the effects of roadway, environmental, vehicle, crash and driver characteristics on hit-and-run crashes. Accident; Analysis and Prevention. 2008 Jul;40(4):1330-6. doi: 10.1016/j.aap.2008.02.003.
2. Tay R, Barua U, Kattan L. Factors contributing to hit-and-run in fatal crashes. Accident; Analysis and Prevention. 2009 Mar;41(2):227-33. doi:10.1016/j.aap.2008.11.002.
3. Knight B. Forensic Pathology, Fractures of the skull, Forensic Pathology, second edition. Arnold, London, 1996; 182-3.
4. Dimaio VJ, Dimaio D, Deaths caused by motor vehicle accidents, Forensic Pathology, second edition, CRC press, Florida, 2000, 313.
5. MacLeod KE, Griswold JB, Arnold LS, Ragland DR. Factors associated with hit-and-run pedestrian fatalities and driver identification. Accident; Analysis and Prevention. 2012 Mar;45:366-72. doi: 10.1016/j.aap.2011.08.001.
6. Aidoo EN, Amoh-Gyimah R, Ackaah W. The effect of road and environmental characteristics on pedestrian hit-and-run accidents in Ghana. Accident; Analysis and Prevention. 2013 Apr;53:23-7. doi: 10.1016/j.aap.2012.12.021.
7. Fujita G, Okamura K, Kihira M, Kosugge R. Factors contributing to driver choice after hitting a pedestrian in Japan. Accident; Analysis and Prevention. 2014 Nov;72:277-86.