

A case report: A patient suffering traumatic injury due to swerving to avoid hitting a deer

Hiroki Nagasawa, Kazuhiko Omori, Ikuto Takeuchi, Kei Jitsuiki, Toshihiko Yoshizawa, Hiromichi Ohsaka, Kouhei Ishikawa, Youichi Yanagawa

Department of Acute Critical Care Medicine, Shizuoka Hospital, Juntendo University, Japan

***Corresponding author**

Youichi Yanagawa

Email: yyanaga@juntendo.ac.jp

Abstract: A 60-year-old male was driving a 650-cc motorcycle at 70 km/h, when a deer jumped into the road from a bush. He tried to swerve to avoid a collision and subsequently fell over, with his motorcycle running over him. On arrival, his vital signs were stable; however, chest roentgen and computed tomography revealed left clavicular fracture, left 5th and 6th rib fractures and left lung contusion with mild hemo pneumothorax. He was admitted to our hospital for conservative treatment and discharged on the seventh hospital day after controlling his pain. To our knowledge, this is the first case of a patient suffering traumatic injury due to swerving to avoid hitting a deer in Japan. Whether attempting to swerve out of the way or colliding directly will reduce the damage to motor vehicles occupants when a deer collision seems inevitable remains controversial. Because there is no database, Japan will need prospectively collect and investigate data regarding motor vehicles collisions with animals.

Keywords: deer; motor vehicle; collision; data base.

INTRODUCTION

Only two oral presentations concerning deer-related injury have been delivered in Japan, and both focused on penetrating injuries due to antlers [1, 2]. However, in foreign countries, there are many reports concerning collisions between motor vehicles and animals [3-7]. We herein report a patient who suffered traumatic injury due to swerving to avoid hitting a deer, with reference to previous reports.

CASE PRESENTATION

A 60-year-old male was driving a 650-cc motorcycle at 70 km/h, when a deer jumped into the road from a bush. He tried to swerve to avoid a collision and subsequently fell over, with his motorcycle running over him. His medical history included sudden deafness and right inguinal hernia. On arrival, he had clear consciousness, with a blood pressure of 138/94 mmHg, heart rate of 96 beats per minute, respiratory rate of 20 breaths per minute and SpO₂ of 100% under 10 L/minute of oxygen delivered via a reservoir mask. The physiological finding was left chest tenderness. Focus assessment sonography for trauma was negative. Chest roentgen and computed tomography revealed left clavicular fracture, left 5th and 6th rib fractures and left lung contusion with mild hemo pneumothorax (**Figure 1**). A biochemical analysis of the blood revealed only leukocytosis (18,900/ μ L) and increased creatinine phosphokinase level (401 IU/L) and D-dimer levels (135.7 μ g/mL) as abnormal findings. He was admitted to our hospital for

conservative treatment and discharged on the seventh hospital day after controlling his pain.

DISCUSSION

To our knowledge, this is the first case of a patient suffering traumatic injury due to swerving to avoid hitting a deer in Japan. Reports concerning collisions between motor vehicles (MVs) and animals are frequent in foreign countries [3-10]. Some regions release annual data on MV collisions with animals [10-12]. Among such collisions, those involving deer are the most frequent [11]. In the United States, nonfatal MV-animal crash-related injuries account for <1.0% of approximately 3 million MV occupants treated in emergency departments annually [11]. However, in rural areas with large deer populations, MV collisions with animals and associated occupant deaths and injuries are major concerns. For instance, in Wisconsin, USA, MV collisions with deer accounted for nearly 16% of all statewide police-reported MV crashes in 2002 [11]. Other reports described numerous deer-related accidents from summer to winter, based on the animals' habits (birthing and mating season), but personal injury peaked in the summer due to drivers' awareness and attitudes during the season, positive correlations between the habitual density of deer and the number of deer-related accidents, the severity of injury seems to be related to the vehicle and animal size, occurrence of more severe injury for riders of motorcycle than car occupants among MV collisions with deer, and unhelmeted riders or unrestrained drivers were found to sustain more severe injuries than their

helmeted counterparts or restrained drivers in vehicles [3-10].

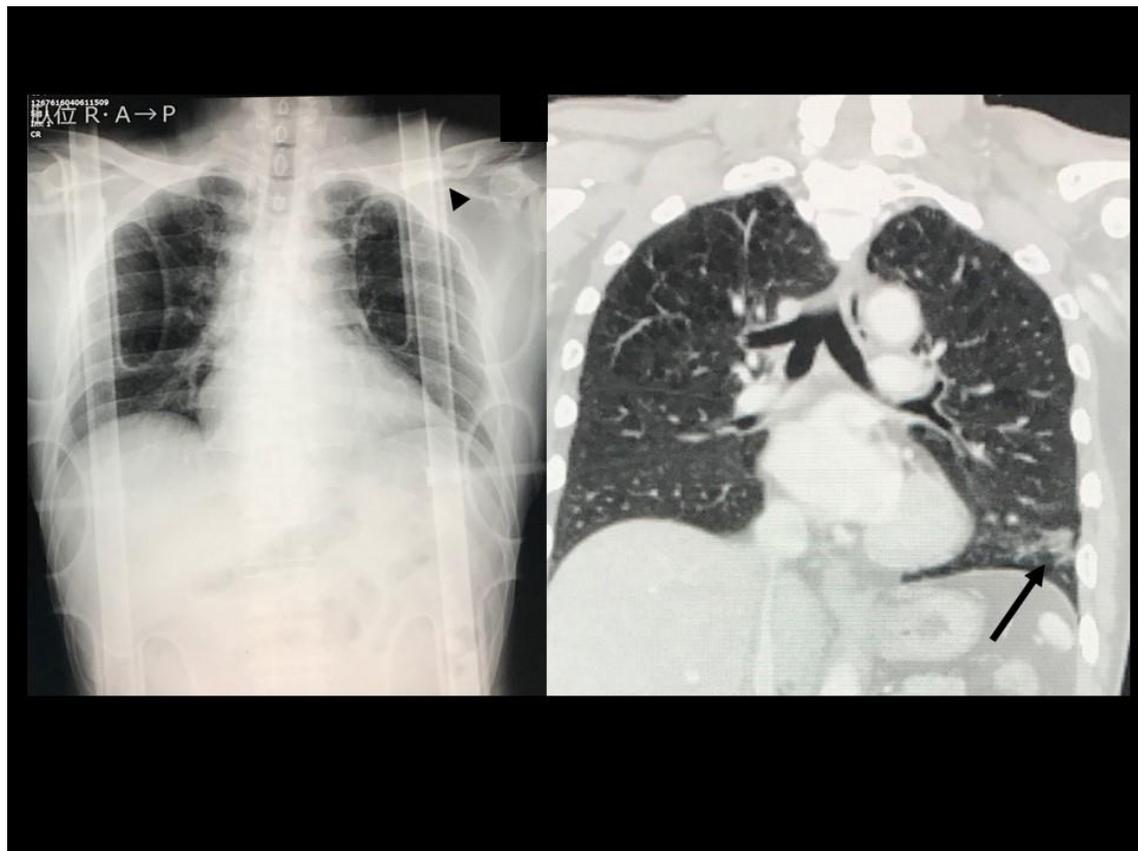


Fig 1: Chest roentgen (left) and computed tomography (right) on arrival. The figure shows left clavicular fracture (triangle) and left lung contusion (arrow).

Although further studies are needed to assess the effectiveness, measures to reduce the rate of collisions with deer have also been reported, focusing on driver education programs, developing better engineering controls and managing deer populations through hunting. [10]. The only foundation for deer protection in Japan (in Nara) released a traffic map indicating frequent crossings where MVs collide with deer near Nara Park (<http://naradeer.com/common/img/problems/trafficmap.pdf>), but this map did not mention any damage sustained by humans.

Whether attempting to swerve out of the way or colliding directly will reduce the damage to MV occupants when a deer collision seems inevitable remains controversial. A State Farm Press Release recommends colliding directly, as attempting to swerve out of the way may result in loss of control of the vehicle or colliding with an oncoming vehicle [13]. Another report concluded that attempting to swerve out of the way most commonly resulted in an MV leaving the roadway (29.0%); hitting a tree, pole, or guardrail (21.4%); or suffering a rollover (17.3%).[11] In contrast, with respect to motorcyclists, some reports have found that directly colliding with an animal

resulted in the worst injury profile, while few motorcyclists who swerved required care, suggesting that swerving on a motorcycle might be more effective than direct collision in avoiding injury. The present patient selected a swerving maneuver and injured himself by falling down. Because there is no database in Japan concerning MV collisions with animals, we cannot discuss the appropriateness of the driver's action in response to an inevitable collision. Accordingly, Japan will need prospectively collect and investigate data regarding MV collisions with animals.

REFERENCES

1. Sato T, Nonaka Y, Kato Y, Miyahara T, Sumi Y. A case of abdominal penetrating injury by a deer. *J Jpn Surg Asso* 2014; 75(12):3403. In Japanese
2. Kuramitsu E, Fukuyama Y. A case of thoracic penetrating injury by a deer. *J Jpn Surg Asso* 2015; 29(3):64-5. In Japanese
3. Niemi M, Rolandsen CM, Neumann W, Kukko T, Tiilikainen R, Pusenius J, Solberg EJ, Ericsson G. Temporal patterns of moose-vehicle collisions with and without personal injuries. *Accident Analysis & Prevention*. 2017 Jan 31; 98:167-73.
4. Smith BW, Buyea CM, Anders MJ. Incidence and Injury Types in Motorcycle Collisions Involving

- Deer in Western New York. *American journal of orthopedics* (Belle Mead, NJ). 2015 Jun; 44(6):E180-3.
5. Oey-Devine TD, Ward JG, Haan JM. Deer-Vehicle Collisions Are Associated with Worsened Outcomes for Motorcyclists and Direct Collisions. *The American Surgeon*. 2013 Dec 1; 79(12):1313.
 6. Gkritza K, Baird M, Hans ZN. Deer-vehicle collisions, deer density, and land use in Iowa's urban deer herd management zones. *Accident Analysis & Prevention*. 2010 Nov 30; 42(6):1916-25.
 7. Smoot DL, Zielinski MD, Cullinane DC, Jenkins DH, Schiller HJ, Sawyer MD. Patterns in deer-related traffic injuries over a decade: the Mayo clinic experience. *Scandinavian journal of trauma, resuscitation and emergency medicine*. 2010 Aug 17; 18(1):1.
 8. Williams AF, Wells JK. Characteristics of vehicle-animal crashes in which vehicle occupants are killed. *Traffic Injury Prevention*. 2005 Mar; 6(1):56-9.
 9. Šprem N, Duduković D, Keros T, Konjević D. Wildlife-Vehicle Collisions in Croatia—A Hazard for Humans and Animals. *Collegium antropologicum*. 2013 Jul 1; 37(2):531-5.
 10. Centers for Disease Control and Prevention (CDC). Injuries from motor-vehicle collisions with moose--Maine, 2000-2004. *MMWR Morb Mortal Wkly Rep*. 2006; 55(47):1272-4.
 11. Langbein J, Putman R, Hooton D. National deer-vehicle collisions database: an update. *Veterinary record*. 2004; 154(24):767-8.
 12. Centers for Disease Control and Prevention. Nonfatal motor-vehicle animal crash-related injuries--United States, 2001-2002. *MMWR: Morbidity and mortality weekly report*. 2004; 53(30):675-8.
 13. When Bumpers Meet Antlers. State Farm Press Release. Last Updated: April 08, 2013. <http://teendriving.statefarm.com/learning-to-drive/driving-with-a-permit/when-bumpers-meet-antlers>