A Comparison of the Outcomes of Swerving To Avoid Deer and Colliding With Deer in the Izu Peninsula

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Abstract: We retrospectively investigated and compared the outcomes of swerving to avoid deer and colliding with deer in the Izu peninsula of Japan. We performed a retrospective medical chart review of all traumatized patients who were involved in motor vehicle accidents from January 2013 to December 2017 and who were treated by the staff of our department. Cases in which the accident did not involve deer were excluded from the analysis. The subjects were divided into two groups: the swerving group, which included patients who were injured after swerving to avoid hitting a deer; and the collision group, which included patients who were injured after colliding with the deer. The characteristics of the patients in the two groups were analyzed. In addition, we cooperated with the Ohito police office (the local police department of Izunokuni and Izu city), to investigate the number of deer-related accidents in 2017. There were 7 patients in the swerving group and 6 in the collision group. The detailed of mechanisms of the accidents in the swerving group were as follows: falling from a motorcycle (n=2), hitting trees along the road (n=1), hitting a guardrail (n=1), hitting an oncoming car (n=1), and falling off a cliff (n=1). There were no statistically significant differences with regard to sex, age, month, time, temperature, weather, estimated speed of the vehicle, vital signs on arrival, lactate level, injury severity score, revised trauma score, trauma and injury severity score, duration of admission or the survival ratio. The collision group included a significantly higher percentage of motorcycle users than the swerving group. The Ohito police (the local police department) manually investigated cases in response to our request and informed us that there were 40 deer-related car accidents that were reported to have occurred without injury in 2017. In this study, the outcome was not affected by swerving to avoid a deer or colliding with the deer; however, theoretically, it would be better for motor vehicle drivers to hit a deer than to swerve to avoid a collision.

Keywords: Deer; accident; swerve.

INTRODUCTION

We previously reported the first case of a patient who suffered a traumatic injury after swerving to avoid hitting a deer in Japan. In contrast, reports concerning collisions between motor vehicles (MVs) and animals are common in foreign countries [2-6]. Whether attempting to swerve out of the way of the animal or collide directly with the animal will reduce the damage to MV occupants when a deer collision seems inevitable remains controversial [1,7,8]. Accordingly, we retrospectively investigated which of the two strategies had the better outcome when MVs encountered deer in the Izu peninsula.

METHODS

This retrospective study protocol was approved by the review board of Juntendo Shizuoka Hospital. The Department of Acute Critical Care Medicine is located in Shizuoka Hospital, a 552-bed hospital of Juntendo University in the Izu Peninsula in Shizuoka Prefecture (near Tokyo). This hospital has acute critical care centers in Eastern Shizuoka that accommodate critically ill patients, such as those with cardiac arrest, unstable circulation, unconsciousness, acute coronary syndrome, stroke, severe trauma, severe burns, or poisoning. Our hospital also has helicopter landing pads for an emergency medical system that utilizes physician-staffed emergency helicopters in Eastern Shizuoka Prefecture and serves a population of approximately 1.2 million.

We conducted a medical chart review to investigate all cases of traumatic injury involving MV accidents that were treated by the staff of our department between January 2013 and December 2017. Cases in which the MV accident did not involve deer were excluded from the analysis. The subjects were divided into two groups: the swerving group, which

included patients who suffered traumatic injury after swerving to avoid hitting a deer; and the collision group, which included patients who were suffered traumatic injury after hitting a deer. The characteristics of the patients in the two groups were analyzed, including sex, age, month, time, temperature, weather when the accident occurred, type of MV (motorcycle or non-motorcycle), estimated speed of the MV, vital signs on arrival (Glasgow Coma Scale, systolic blood pressure, heart rate and respiratory rate), lactate level, injury severity score, revised trauma score, trauma and injury severity score, duration of admission and survival ratio.

In addition, we collaborated with the Ohito police office (the local police department in Izunokuni and Izu city) to investigate the number of deer-related accidents in 2017. The results were analyzed by a chi-squared test and the non-paired Student's *t*-test. P values of <0.05 were considered to indicate statistical significance.

RESULTS

During the investigation period, a total of 8565 patients were treated by our staff. Among these, the following patients were excluded: non-traumatized patients (n=4125), patients who were not involved in MV accidents (n=2508), and patients whose injuries were not related to accidents involving deer (n=1919). As a result, 13 traumatized patients with deer-related injuries were included in the analysis and were classified into the swerving group (n=7) and the collision group (n=6). The detailed mechanisms of accident in the swerving group were as follows: falling from a motorcycle (n=2), hitting trees along the road (n=1), hitting a guardrail (n=1), hitting an oncoming car (n=1), and falling off a cliff (n=1).

The results of the analyses of the two groups are summarized in Table 1. There were no statistically significant differences with regard to sex, age, month, time, temperature, weather, estimated speed of the MVs, vital signs on arrival, lactate level, injury severity score, revised trauma score, trauma and injury severity score, duration of admission and survival ratio. The collision group included a significantly higher percentage of motorcycle users than the swerving group.

The Ohito police (the local police department) manually investigated cases in response to our request and informed us that there were 40 deer-related car accidents that were reported to have occurred without injury in 2017.

Table-1: The results of the analysis

		Swerving; n=7	Collision; n=6	p-value
Sex (M/F)		6/1	6/0	n.s.
Age		40.0 +13.6	47.0 + 14.7	n.s
Month	January	0	0	n.s.
	February	1	0	
	March	0	0	
	April	1	0	
	May	0	1	
	June	1	2	
	July	1	0	
	August	0	1	
	September	0	1	
	October	1	0	
	November	1	1	
	December	1	0	
Time		9.4 + 6.8	9.2 + 8.2	n.s.
Temperature (Celsius)		21.1 + 6.6	24.0 + 5.2	n.s.
Weather (Fine/no fine)		2/5	1/5	n.s
Vehicle (motorcycle/non motorcycle)		2/5	6/0	0.01
Speed (km/h)		50.0 + 15.8	60.0 + 18.9	n.s
Glasgow Coma Scale		14.8 + 0.3	15.0 + 0	n.s.
Systolic blood pressure (mmHg)		150.4 + 26.4	124.0 + 15.3	0.07
Heart rate (beats per minute)		86.2 + 14.3	79.0 + 11.9	n.s.
Respiratory rate (breaths per minute)		19.1 + 4.5	23.0 + 5.7	n.s
Lactate (mmol/l)		2.0 + 1.5	2.6 + 1.1	0.1
Injury severity score		6.8 + 5.5	11.0 + 6.1	n.s
Revised Trauma Score		7.8 + 1.9	7.7 + 0.1	n.s
Trauma and injury severity score		0.98 + 0.01	0.98 + 0.01	n.s
Duration of admission (days)		23.8 + 32.1	9.0 + 11.1	n.s
Survival ratio (%)		100	100	n.s.
n.s., not significant				

DISCUSSION

This is the first report to retrospectively investigate and compare the outcomes of motor vehicle accidents involving patients who swerved to avoid a deer or collided with a deer in the Izu peninsula of Japan. The results of our analysis suggest that neither strategy affected the final outcome. However, is this correct? If the driver of the car elected to hit the deer, the car continued on its course without hitting a tree, guardrail, oncoming car or falling off a cliff. The car would be damaged but the driver or passenger of the car would escape uninjured. Furthermore, a motorcycle rider who hits a tree, guardrail, oncoming car, or falls off a cliff when swerving to avoid hitting a deer might suffer fatal injuries. Accordingly, although it was not directly shown by our results, in theory, it would be better MV drivers to hit the deer without avoiding a collision.

This manuscript is associated with several limitations. It was a retrospective study and the study population was very small. In addition, no fatal deer-related accidents have been reported in Japan to date (including our report). This point differs from previous foreign reports [2-6]. This may be based on the physical difference between Japanese deer and the deer in other countries; Japanese deer tend to be smaller in size. Furthermore, we may have missed some fatal cases in which a driver died due to traumatic injury after avoiding a deer, if the accident was not witnessed. Thus, further large prospective studies that include a database of deer-related injuries are warranted to determine whether it is better for motor vehicle drivers to swerve to avoid a deer or to hit the deer without avoiding the collision.

CONCLUSION

The two strategies of swerving to avoid deer or colliding with the deer did not affect the final outcome of the study. However, theoretically, it would be better for MV drivers to hit deer without avoiding the collision.

Source

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