

## CASE REPORT

Koichi Uemura,<sup>1,2</sup> M.D., Ph.D. and Ken-ichi Yoshida,<sup>3</sup> M.D., Ph.D.

# Seat Belt Induced Transection of the Trachea in a Child on the Lap of an Adult

**REFERENCE:** Uemura K, Yoshida K. Seat belt induced transection of the trachea in a child on the lap of an adult. *J Forensic Sci* 2001;46(3):714–716.

**ABSTRACT:** As a victim of his parents' suicide, a three-year-old boy was found dead on the lap of the passenger in the left front seat of a car that dove from the wharf and crashed into the sea. He died from the transection of trachea due to shoulder belt in the absence of the signs of drowning. The seat belt paradoxically injured the child on the passenger's lap in the traffic accident. The popular custom of Japanese parents of holding their children on their laps in cars is dangerous, while another custom of killing their children upon suicide of parents or couples should be socially and legally controlled.

**KEYWORDS:** forensic science, forensic pathology, trachea transection, seat belts, multiple suicide, traffic accidents, child abuse

Seat belt use is well known to reduce serious injuries in automobile accidents (1), though its effectiveness with children is doubtful. It is customary in Japan for many parents to hold their children on their laps while traveling in a car. Also, in Japan, suicide of couples, married or lovers (called "Shinju"), along with their children is all too common. In the case presented here there was a triple suicide (or a single suicide with double homicide) with a three-year-old child being held on a parent's lap while the mother drove the car into the sea. The cause of death for the child was transection of the trachea by the shoulder harness of the seat belt assembly. The mechanism of the injury and death of the child as well as the social patterns of holding a child on the parent's lap with the child's murder being caused by the mother's suicide is presented.

### Case History

On a night in June a 25-year-old mother drove a small car at high speed from a wharf into the sea. Witnesses stated that the car floated for a moment. Three h later the car was removed from the sea. The primary damage to the vehicle was the crushing of the front end (Fig. 1). The mother was in the driver's seat. The body of a three-year-old boy was found on the lap of the passenger (the

boyfriend of the mother) in the left front seat. The man had fastened his shoulder-harness seat belt so that the shoulder strap portion went across the neck of the boy. The boy's legs were on the front dashboard (Fig. 2). This indicated the boy received his primary decelerative force on his neck by the restraining belt. Both adults were diagnosed as death due to drowning as evidenced by froth in their tracheas.

### Autopsy Findings

The autopsy showed a moderately well nourished boy consistent with being three years of age. There were small, patchy areas of subdermal bleeding in the frontal and occipital areas of the head. There were several conjunctival petechiae. The primary areas of external trauma were on the anterior neck and upper chest consistent with the impact against the diagonal shoulder strap. The pattern of contusions runs in a line projected from the right axillary area (but with the contusions starting in the right mid axillary line) and running medially and superiorly to the suprasternal notch. The contusion starts again at midline over the larynx, measuring 4.0 by 1.5 cm, lying diagonally across the anterior left neck running from the lower right to upper left (Fig. 3). The trachea was transected in a nearly horizontal plane 2.1 cm below the vocal cords with hemorrhage into the adjacent muscle and cartilage (Fig. 4). There were hemorrhages into the sternocleidomastoid and sternohyoid muscles. There was neither froth nor sea water in the trachea but there was a moderate amount of bloody and foamy fluid quite different from the frothy material found in the tracheas of the parents. The lungs were distended and weighed 170 and 180 g. However, there was no evidence of edema or congestion. There were no rib fractures but there were focal hemorrhages into the intercostal muscles of the mid anterior chest. There were petechial hemorrhages and Tardieu spots on the pleura of the left interlobar fissure. There was hemorrhage in the perihilar regions.

Microscopic examination of the lungs showed disruption of connective tissues with hemorrhage around the bronchioles. However, there was no evidence of edema or congestion. These findings indicate death by traumatic asphyxia. There was no evidence of trauma or disease in the heart, liver, spleen, kidneys, adrenal glands, and pancreas. The arteries and veins of the neck and chest showed no evidence of trauma. The skull and dura showed no evidence of trauma but there was minor subarachnoid hemorrhage. The blood in the heart was not coagulated suggesting the acute death of the victim.

<sup>1</sup> Research Associate, Department of Legal Medicine, Yamaguchi University School of Medicine, Yamaguchi, Japan.

<sup>2</sup> Research Associate, Professor, Department of Forensic Medicine, Graduate School of Medicine, University of Tokyo, Tokyo, Japan.

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FIG. 1—The damaged front end of the car after salvaging from the sea.



FIG. 2—The passenger in the left front seat. Note his shoulder-harness seat belt of which shoulder strap portion was situated across the anterior neck of the boy. Driver shown in background.

## Discussion

This case report documents the transection of trachea of a three-year-old boy which occurred while he was sitting on the lap of a front seat passenger in a car that was driven at high speed from a wharf into the sea. Roh and Fazzalero reported a case of tracheal transection which occurred during a traffic accident on a slippery and icy road (2). The fatality in their case was caused by the submarining of the body when there was improper application of automatic seat belt. The body “submerged” forward but with the head and neck held firmly by the shoulder belt. The victim in our report experienced a similar situation. Gannett and Braunstein first coined the “seat belt syndrome” in 1962 (3). They subdivided the pattern of injuries into: “shoulder belt injury,” “lap belt injury,” and “combined shoulder-lap belt injury.”

In our case, the two intramuscular hemorrhages between the middle anterior ribs could be due to injury from the lap belt but the neck injury was caused by shoulder belt. There are reports of carotid artery trauma due to seat belt injury (dissection, laceration, hematoma and transection) (4–6) though there was no such injury

in our case. Rupture of the distal esophagus (7), spinal injury (8), and laryngeal fracture (9) have also been reported due to seat belt trauma. The intense impact of the anterior neck region and/or the forward flexion of the head may also induce vagal reflex that can lead to cardiac arrest, as we reported in the case of a driver in an accidental collision (10). Because of the absence of signs of drowning we feel that he died from asphyxia due to the obstruction of the upper airway at the site of the transection.

The common practice in Japan of parents holding their children on their laps in automobiles contributes to anterior neck injuries due to the shoulder strap portion of the seat belt assembly. The advent of the new Japanese law which takes effect in April 2000 requires the use of an “infant seat,” a small seat with restraining straps designed for children, that is fixed onto the regular passenger seat. The new law applies to the children under six years old inside a car, including both front and rear seats. It is anticipated that this will reduce trauma to children in automobile accidents.

In Japan the double suicide of parents is often accompanied by the murder of children. Suicide rates in Japan have been increas-



FIG. 3—The pattern of contusions, one from the right axillary area, running medially and superiorly to the suprasternal notch. Another contusion starts at midline over the larynx, situated diagonally across the anterior left neck running from the lower right to upper left.



FIG. 4—The trachea was completely transected in a nearly horizontal plane 2.1 cm below the vocal cords (arrows), with hemorrhage into the adjacent muscle and cartilage.

ing, presumably in relation to the economic depression the country has experienced. Suicide case numbers have gone from 24 391 in 1997 to 32 863 in 1998. The number of "Shinju" cases as also increased from 432 in 1997 to 592 in 1998. The children in "Shinju" cases are often killed before the double suicide of the parents. Currently there is also a marked increase in child abuse cases in Japan. To protect the rights of children, campaigns from the administrative or educational viewpoints are required. Legislation concerning control of child abuse and murder must be considered.

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Additional information and reprint requests:

Koichi Uemura, M.D., Ph.D.  
 Department of Forensic Medicine  
 Graduate School of Medicine, University of Tokyo  
 7-3-1 Hongo, Bunkyo-ku  
 Tokyo, 113-0033  
 Japan  
 Tel: +81-3-5841-3367