



# One Case of Severe Head Injury Secondary to Multiple Organ Failure

**Dawei Jiang<sup>\*</sup>, Li Kang**

Fujian Hengzheng Forensic Laboratory, Sanming, 365000, China

Email: 1102159834@qq.com

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**Abstract:** To investigate the cause of death of the identified person, the causation between injury and disease was analyzed. This appraisal uses the forensic pathology examination method and unifies the medical record data to carry on the autopsy and the pathology examination for the patients. Through identification, it is considered that the identified person died of severe craniocerebral injury, thoracolumbar vertebra fracture and secondary multiple organ failure due to traffic accident.

**Keywords:** severe head injury, forensic pathology, cause of death identification

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## 1. Case

### 1.1 Case introduction

On July 8, 2018, Deng was knocked down by a small ordinary passenger bus on the county highway from west to east to the front of No. 562, and was then sent to the County People's Hospital for treatment, and was discharged on August 24, 2018. In 2018, Deng died at home on December 31.

### 1.2 Medical record

On July 8, 2018, the patient was knocked down by a car 2 hours before admission, and injured his head, chest, and waist. After the injury, he continued to be unconscious, and the right top scalp soft tissue was swollen, and he saw a 3 × 3cm star-shaped wound. Contaminated, not touching depressed fractures, deformed limbs, stinging limb flexion, poor left limb movement compared to the right side. At the time of admission, a coma, CT report on July 8, 2018 showed: 1. Multiple brain contusions, cobwebs Subperitoneal hemorrhage, multiple lacunar cerebral infarction (some obsolete), brain atrophy, leukoencephalopathy, foreign body retention in the soft tissue of the right top scalp; 2. right rib fracture (stale), T11 vertebral compression Fracture, chronic bronchitis, emphysema, right pleural hypertrophy, calcification of the aorta and left coronary artery; 3., L4 right transverse process fracture. Preliminary diagnosis: 1. Severe craniocerebral injury, scalp laceration; 2 Contusion of both lungs; 3. T11 compression fracture; 4. L4 right transverse process fracture.

The patient was discharged on August 24, 2018. Status at the time of discharge: consciousness, poor intelligence, poor directional force, incontinence with bowel movements, indwelling urinary catheterization. Physical examination: stable vital signs, about 2.5mm pupils on both sides, light reflection Existence, no term strength, normal cardiopulmonary auscultation, normal limbs. Recent CT report (August 16, 2018, CT number: 049944) shows: left cerebellar infarction, multiple cerebral softening, right frontal old cerebral infarction, brain Atrophy, white matter disease. Discharge diagnosis: 1. Severe craniocerebral injury, scalp laceration; 2. Lung contusion; 3. T11 compression fracture; 4. L4 transverse process fracture; 5. Hypertension.

### 1.3 Autopsy

On January 1, 2015, the staff of our laboratory performed a forensic autopsy on the body of the deceased Deng, and extracted some organs for pathological examination.

The autopsy showed that the dead body was 154cm long and 1.5cm long, and the body was thin and had cachexia. The oldness of 3cm×1cm and 16cm×1cm was seen between the front line of the 6th subcostal axillary line and the posterior axillary line on the right. Scars, 6.5cm×1cm bedsores on the lower back, 0.8cm×0.5cm, 1.2cm×0.5cm, 0.5cm×0.5cm epidermal exfoliation on the left side of the upper back spine, and 1.2cm×0.5cm epidermal exfoliation on the left shoulder area. A 1cm×0.5cm scab was seen on the outside of the left knee, and a 4.5cm×1cm old scar was seen at the root of the right thigh.

Autopsy findings: no skull fractures, no epidural bleeding, no atherosclerotic plaques in the cerebral basal arteries. Microscopic dilatation and congestion of small blood vessels in the subarachnoid space and brain parenchyma, arteriosclerosis, and vitreous wall of the brain under microscope Degeneration, amyloid bodies in the brain parenchyma, mild edema in the brain tissue, focal softening in the white matter region of the brain, and more glial cells, foam cells, and

fibrous connective tissue.

The heart weight was 300g, and the left and right ventricular walls were 1.5 cm and 0.3 cm thick; chicken fat-like clots were seen in each ventricular cavity. Coronary artery examination: 7 cm long intermittent III-IV atherosclerotic plaques were seen from the branch of the left anterior descending branch. Block with intra-plaque hemorrhage, the right trunk is 5.5cm long from the opening I-II Grade atherosclerotic plaques, 2.5cm long III-IV grade atherosclerotic plaques are seen below 0.5cm. Microscopically, the left anterior descending lumen is eccentrically narrowed, fibrous caps are formed, and more amorphous necrotic material is seen in the plaque. , Calcium salt, focal hemorrhage, and cholesterol crystals. The left ventricle and papillary myocardial cells were focally hypertrophic, and the right ventricle was not significantly abnormal.

The left and right lungs weighed 650g and 520g, respectively, and the adhesion between the two lung lobes. Microvessels and small blood vessels in the alveolar wall were dilated and congested under the microscope. Focal edema, hemorrhage, and emphysema were seen in the lung tissue, and pulmonary alveoli formed at the edge of the lung tissue In the alveolar cavity and bronchial cavity, there are more inflammatory cells mainly dominated by neutrophils, and some bronchial cavity can see mucus and exfoliated epithelial cells.

The liver weighed 800 g, and no abnormalities were seen on the surface and cut surface. Microscopic liver congestion was seen under the microscope, and liver cells were slightly dehydrated.

The spleen weighed 50 g, and no abnormalities were seen on the surface and cut surface. Microscopic observation showed splenic sinus congestion, microsclerosis of the central splenic arteries, and hyaline degeneration of the tube wall.

Both kidneys weighed 130g, and cysts of various sizes were seen on the surface, the largest was 0.8cm×0.6cm, and the thickness of the cortex was 0.5cm. Microscopic glomerular capillary plexus and small renal blood vessels were dilated and congested under the microscope. Partial glomerulosclerosis And vitreous degeneration; focal lymphocytic infiltration and cysts are seen in the renal parenchyma; homogeneous red-stained protein casts are seen in the renal tubules; renal interstitial fibrous connective tissue hyperplasia.

Pancreatic, adrenal, gastric and bowel wall were normal.

#### **1.4 Forensic pathology diagnosis**

- (1) Severe head injury (combined with medical records);
  - ① scalp laceration;
  - ② Subarachnoid hemorrhage;
  - ③ Multiple brain contusions;
- (2) An old fracture of the right rib, a t11 vertebral compression fracture, and a 14 right transverse process fracture (combined with medical records);
- (3) Severe coronary atherosclerosis (left anterior descending branch disease IV Grade with intraplaque hemorrhage, right main lesion IV level);
- (4) bronchial pneumonia, pulmonary edema, bleeding, emphysema;
- (5) arteriosclerosis of the brain and spleen;
- (6) hepatic congestion, mild degeneration of liver cells;
- (7) Renal cysts, glomerulosclerosis, interstitial fibrous connective tissue hyperplasia, and a large number of casts in the renal tubules;
- (8) spleen congestion;
- (9) Back bedsores, severe malnutrition.

## **2. Discussion**

(1) Severe cerebellar injury is the most severe type of acute closed craniocerebral injury, and its judgment is mainly based on the recurrence of coma or worsening of consciousness within 12 hours after injury, extensive brain injury or skull fracture, and obvious nerves. Systematic positive signs <sup>[1]</sup>. According to the autopsy of the deceased, subarachnoid congestion was found, and combined with the patient's continued coma and neuropositive signs after the injury, the deceased's severe craniocerebral injury can be confirmed again <sup>[2]</sup>. Severe craniocerebral injury can not be reversed despite full treatment. In terms of rescue, non-surgical treatment is difficult to succeed, and the survival time of patients after surgery is significantly higher than that of non-surgical treatment patients <sup>[3]</sup>. He received treatment only 2 hours after the injury and had no surgical treatment, which laid a hidden danger for future rehabilitation.

(2) Multi-organ failure (MOF) is a disease with many causes, complicated pathogenesis, and extremely high mortality.

It refers to the occurrence of two or more organ dysfunctions, or even functional failure, after the body has suffered severe damage. Syndrome<sup>[4]</sup>. Pay attention to the following two points when identifying mof: ① The primary pathogenic factor is acute, and the secondary damaged organs are far away from the site of the primary damage; There is often an interval, which can be hours or days<sup>[5]</sup>. The mortality rate of mof is very high and increases with the number of failed organs. The mortality rate of patients with 1 organ is 30%, and the mortality of 2 patients The rate is 50% - 60%, and the mortality rate of more than 3 people is 72% -100%. The mortality rate is also related to the patient's age, etiology, and underlying disease. Severe trauma and advanced age, Low immune function Malnutrition Chronic diseases, organ dysfunction, and other factors can be its cause. Pathological changes in its organs indicate insufficient blood perfusion in each organ: ① lung dysfunction; ② kidney dysfunction; ③ liver dysfunction; ④ heart dysfunction.<sup>[6]</sup> According to the medical records, the primary injuries of the deceased were mainly craniocerebral and chest, and the deceased suffered liver, kidney, and spleen damage, which meets the first point of the disease; the deceased died after 4 months of clinical symptoms In line with the second point, combined with the severe malnutrition of the deceased and insufficient blood perfusion in each organ, it can be judged as multiple organ failure.

### 3. Conclusion

According to the results of forensic autopsy and pathological examination of the dead Deng Shiyang, it was found that his body surface had bedsores, severe malnutrition and bronchial pneumonia, combined with clinical data and case information, his scalp was injured by a traffic accident on July 8, 2018, Subarachnoid hemorrhage, multiple cerebral contusion and laceration, t11 vertebral compression fracture, l4 right transverse process fracture, comprehensive analysis believes that Deng Shiyang caused severe head injury, thoracolumbar fracture due to traffic accident, secondary multiple organ Death due to failure<sup>[7]</sup>.

### 4. Experience and deficiency

The special and appraisal experience in this case is that in the process of forensic appraisal, fully based on clinical medical records and other data, it can save a lot of time and effort for forensic pathology identification, but forensic pathology testing is different from clinical medical treatment and requires clinical medical treatment. The data is screened, and the clinical data can be used only after mutual verification, which also reflects the independence of forensic medicine<sup>[8]</sup>. With the support of a large number of theoretical and practical data, the identification results are powerful and persuasive, and more relevant to the families of the deceased. All parties agree.

The identification also revealed the following deficiencies. (1) The deceased in this case are middle-aged and elderly, and the phenomenon of multiple diseases is typical. It is more urgent to analyze the role of each disease in death and the true cause of death among many diseases. Especially when the dead Older and severely malnourished, after serious injury, it is important to consider whether it is sudden death with multifunctional failure. (2) When the appraisal agency entrusted the appraisal, it failed to hand over the relevant information in full. During the inspection, the center needs to be re-examined. Contact verification, in order to ensure the smooth progress of the appraisal, the inspection records and checklists should be prepared as soon as possible. (3) The forensic pathological anatomy site is in the wild, and the poor environment is not conducive to the extraction and fixation of organs. For the safety of materials, an anatomical room with anatomical conditions should be selected.

## References

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