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Analysis and epidemiologic characteristics of 106 patients with cervical vertebral fracture caused by traffic injury

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Objectives Through investigating the epidemiology characteristics and injury mechanisms of cervical fracture caused by traffic accidents, to guide clinicians better diagnosis and treatment with cervical injury.

Methods Car accident injury patients were selected from the 287 hospital with cervical fractures between January 2009 and November 2010. Through extracted their cases and imaging data retrospectively, all the patients' age, gender, possible injury mechanisms, injury segment, fracture type, neurological condition and treatment after admission were analyzed and discussed. To summarize the susceptible group of cervical fracture, sensitive segment, common type of fracture, as well as the rule of age, gender, injury mechanism for the type of cervical fracture, segmental, neurological influencing. In this study, upper cervical spine fracture contains the anterior arch of atlas types, posterior arch, lateral mass and Jefferson fracture, axis odontoid fracture, hangman fractures. However, the fractures of lower cervical spine fracture rely on AO type classification, neurological evaluation depends on Frankel grading standards.

Results Totally 106 traffic patients with cervical spine fractures were admitted during two years, with mean age of 38 years (15-17 years), male to female ratio of 3.24:1. The age peak of injured persons were in the 20-30 and 40-50 years; including 23 motorized/electric car drivers or passengers (21.7%), 15 pedestrians or riding bike patients (14.1%), and 68 automobile driver or passenger (64.2%). A total of 71 patients (67%) were with spinal cord injury. Different mechanisms of injury, age factors on spinal cord injury showed no significant relationship and 34 patients (32%) were multi-segment cervical

fractures. Cervical spine fracture caused by traffic accidents usually occurred in the C5 (24.8%) and C2 (17.0%), among these upper cervical spine fracture patients the odontoid fracture is B-type (68/116 cases). Including 62 patients treated conservatively and 44 patients with surgical treatment, the neurological function recovery of patients treated by surgery is superior to that by conservative treatment, besides, the extent of neurological function with the time between injury and surgery is inversely proportional.

Conclusions The cervical spine fractures caused by traffic accidents results in a high risk of spinal cord injury, and these patients are mostly young crowd, which caused such a high rate of disability. Traffic injuries in newly diagnosed patients with medical treatment received special attention is required if cervical spine injury, these patients of the fracture in the cervical spine with spinal cord injury having clear surgical pointer, should be actively and timely arrangements for surgery to increase recovery of nerve function possible. In the area of prevention, increasing motor vehicle and pedestrian road management and protection were without delay. ■

Analysis on the basic characteristics of mountainous expressway fatal traffic accidents and countermeasure

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The fatal traffic accidents on Mountainous Expressway was analyzed, so did the characteristics and causes regarding to the accident modality, traffic environment, accident time, type of vehicle technology and vehicle types, based on which the prevention and reduction measures are suggested.

1. Accident characteristics

1) Accident modality It is similar to that of the rear-end impact in the plain highway, besides there are a large portion of the single vehicle accidents and the pedestrian accident, which resulted in a higher casualty rate. The restriction of

mountain geographical conditions, with more up-and-down ramps, corners and tunnels, and then the car in front is too fast or too slow and distance control is not good, it would lead to rear-end accident easily; the poor safety consciousness of pedestrian made them across the highway, which often led the crash happen; poor vehicle condition, not familiar with the road, and speeding are the chief causes for the single vehicle accidents.

2) Traffic Environment The indexes in sunny weather conditions, such as the number of accidents, the number of deaths and injuries are much higher than the indexes in other weather conditions. Main reasons: weather is good; drivers are more likely to let down their guard, illegal drive more easily, leading to accidents. Under different lighting conditions, the accident statistics circumstances show that, the number of accidents and deaths during the day and other indices are higher than the index of the night.

3) The time of the accident occurred The most accidents happened in 7:00 to 9:00, and 18:00 to 21:00. Reason: at the stage of time change between day and night, the driver's psychological state is excited or fatigued, line of sight is vague, along with more pedestrian haunted. During 11:00 - 14:00 the number of accidents is the least because of the less vehicle flow.

4) The technical performance of vehicles and the types of vehicles From the accident vehicles' technical performance, 71.56% of the accident vehicles meet GB72582004 requirements, 28.44% can not reach the relevant national standards. Trucks account for 53.61% of total accidents vehicles in serious traffic accident, cars account for 30.41%, passenger cars accounted for 11.86%. The poor vehicle condition and the bad habits of the truck drivers made trucks the largest proportion.

2. The Countermeasure

1) Human factors: education and publicity, elimination highway butt accidents; strict drivers' examination system, acceleration in the training of highway traffic management expertises.

2) To further enhance the technical performance of the vehicle testing.

3) On the basis of ensuring the highway alignment design and the quality of construction of the building to enhance

the conservation and maintenance of highways, improve, and strengthen road safety measures.

4) Strengthening statistical analysis of highways traffic accidents, to grasp the rules and characteristics of traffic accidents, is conducive to early prevention and targeted treatment.

Key words: mountainous expressway, traffic accident, prevention measures. ■

Compensating age related physical and cognitive impairments of older drivers by technological measures and training

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In many countries in Europe, America and Asia, the proportion of older persons in the population is rapidly increasing. Safe traffic participation is very important for the independent functioning and quality of life of older persons and they are increasingly dependent on private cars. In principle, driving a car is very userfriendly for older persons because it allows transport from door to door in a relatively protected cocoon. However, with increasing age the body becomes more vulnerable and the prevalence of impaired sensory, motor and cognitive functions caused by aging related neurological and ocular diseases, does increase, reducing fitness to drive.

To a certain degree, technological measures in the traffic system can compensate these impairments. Adaptations of the infrastructure as proposed in "sustainable safe", a European policy for making the traffic infrastructure forgiving with regard to human error and frailty, are generally favorable for older drivers because they increase predictability of the road environment, separate opposing traffic streams and reduce speed differences. Care has to be taken, however, that infrastructural characteristics intended to reduce speed in general, do not make the driving task so difficult for impaired older drivers that they drive too slow or otherwise hinder the flow of traffic. Advanced invehicle driver assistance systems (ADAS) may suffer less from this problem because they

can be adjusted to the individual needs and preferences.

Some frequently occurring older driver impairments (MCI, AD, PD) will be discussed in the light of developments in Intelligent Transport Systems (ITS) and ADAS, and it will be considered what existing and future to be further developed systems appear to be important for sustainable sage mobility in impaired older drivers. It is proposed that ITS and ADAS interventions should be designed and applied in such a way that potential mobility and safety effects are not regulated away by social and behavioral adaptation. This issue is currently the subject of research going on in the EU funded Marie Curie Initial Training Network "Adaption", also with a special emphasis on older drivers. One expectation is that speed regulation and warning systems which young drivers consider as a nuisance, are viewed as helpful and pleasant by older drivers and that the positive safety and mobility effects will not be regulated away by undesired behavioral changes.

Even with optimally (older) userfriendly infrastructure and incar technology, the driver remains an essential element in the loop and opportunities must be provided to allow older drivers to compare their functioning with what is required ("calibration") and to improve their functioning by driver education and training in the use of new technology. Advanced driving simulators can play an important role there as will be illustrated by ongoing research in the "Adaptation" network and on visual strategy training in drivers with visual impairments. Finally, consequences of the new technological development for the assessment of fitness to drive will be briefly discussed. ■

Different effect of codeine/paracetamol on driving performance in a monotonous surrounding as a function of age

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Introduction Epidemiological

studies revealed that drug consumption is suspected to increase the risk of driving accidents. Among drugs, the association of codeine/paracetamol who is considered one of the most efficient to ease pain as compared to other analgesics of level II in the WHO classification, could decrease vigilance and thus impair driving performance. However, few experimental study evaluated codeine effects on driving, and they only tested these effects on young healthy drivers whereas elderly people represent a large part of drivers and are used to consume this type of drugs. The objective of the present communication is to compare the behavioural effect of therapeutic dose of codeine/paracetamol on simulated driving in subjects of different age.

Methods The effects were evaluated in two groups of 16 subjects, young (2030 years) and aged (55 to 65 years). One hour of monotonous driving performance was evaluated after 1 dose of codeine/paracetamol (20mg/400mg) intake and compared to a placebo in a double blind and balanced design. Pills were taken at 8AM, monotonous driving task was performed with a monoscreen driving simulator one hour after at the theoretical plasma peak concentration of the drug. Participants had to keep a constant speed of 110km/h and a stable trajectory in the center of the right place. Standard deviation of both the lateral position and the speed, the number of road exits were analysed. Plasmatic concentration of codeine, morphine and paracetamol were determined at the beginning and at the end of the experiment.

Results They showed that the minimal therapeutic dose of codeine/paracetamol used here differently affect driving performance in function of age. Young subjects performances did not vary after drug intake whereas aged subjects performance were impaired. In particular aged subjects standard deviation of lateral position on the lane (SDLP), which is considered as the most sensitive parameter to investigate drugs effects, increased after the minimal therapeutic dose of codeine/paracetamol. Moreover, aged subjects seemed to eliminate the drug more slowly than young subjects. These results are in agreement with our past study on the effects of zolpidem revealing that this hypnotic which did not appear at risk for driving in healthy young subjects could be at risk for aged subjects. These results underline the necessity to evaluate the effects of drugs in several aged range. ■