

## Department of Forensic Medicine

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### General Summary

Our main research projects in 2006 have focused on the fields of forensic pathology, forensic application of DNA analysis, and forensic toxicology. Topics within forensic pathology include sudden, unexpected infant death, particularly infant mechanical suffocation death during sleep; the analysis of the pattern and severity of traffic injuries; and forensic autopsy cases related to medical practice.

### Research Activities

#### *Forensic pathology*

##### 1. Importance of infant mechanical suffocation during sleep

The cause of death in cases of sudden unexpected infant death during sleep is often diagnosed as sudden infant death syndrome (SIDS) with or without autopsy. Such a diagnosis can lead to medicolegal problems when a judge attempts to determine whether the cause of death is accidental, intentional, or SIDS. The purpose of this study was to identify the prevalence and importance of mechanical suffocation deaths during sleep in infants younger than 11 months and to propose risk factors for infant suffocation death during sleep. Autopsy cases in which the cause of death was diagnosed as mechanical suffocation were reviewed and analyzed according to the autopsy protocols, the clinical history, and the death scene investigation. A total of 47 cases of suffocation were statistically analyzed and compared with 184 control cases. We found that age younger than 6 months, cosleeping, a soft bed surface, oronasal obstruction, and the prone facedown position were important risk factors for infant suffocation death during sleep. Furthermore, 3 or more of these risk factors were present in each case of infant suffocation death during sleep. To avoid preventable deaths in infancy, the importance of infants sleeping alone on firm bed surfaces should be publicized.

##### 2. Traffic injury

###### 1) Analysis of injuries in bicycle accidents

We are analyzing the severity and patterns of injury in bicycle accident autopsy cases by using the Injury Severity Score and the 1998 revision of the Abbreviated Injury Scale. The head and neck are the most common sites of severe injury in motorcyclists and bicyclists. We are analyzing injuries of the head or neck in motorcyclists and bicyclists dying in traffic accidents and investigating the effects of helmet use on these injuries.

##### 3. Autopsy cases related to medical malpractice

Public concerns about medical safety have recently increased in Japan, reflecting the increase in medical malpractice litigation and extensive media coverage. This study focused on characteristics of autopsy cases related to medical practice based on examinations at The Jikei University School of Medicine. The association between medical

practice and death was reviewed in 3,000 cases. A total of 257 cases related to medical practice were analyzed in terms of sex, age, cause of death, involved clinical subject, location of patient at serious exacerbation, and suspected type of malpractice. In these 257 cases, the percentage of female patients (41.6%) was greater than that in all 3,000 cases, and patients in their 70s accounted for the highest percentage of patients (16.3%). Deaths were natural in 70.8% of cases but were attributed to external causes in 28.8% of cases. The most commonly involved clinical specialty was internal medicine, followed by surgery and psychiatry. Serious exacerbations occurred when the patient was outside medical institutions in 37.7% of cases. The most common cause of medical malpractice (52.1% of cases) was incorrect diagnosis. The analysis of the autopsy cases related to medical practice might provide useful information for increasing medical safety.

#### *Forensic application of DNA analysis*

##### 1. Personal identification of war remains by DNA analysis

We performed personal identification of war-dead remains buried in the former Soviet Union by means of DNA analysis as part of the war-dead remains return project of the Ministry of Health, Labour and Welfare. We used single nucleotide polymorphisms of hypervariable regions of mitochondrial DNA and short tandem repeats of nuclear DNA as genetic markers.

#### *Forensic toxicology*

##### 1. Quantitative analyses of medicines and poisonous substances

Medicines and poisonous substances suspected to have caused deaths were quantitatively analyzed with gas chromatography and with gas chromatography/mass spectrometry of samples obtained at autopsy.

##### 2. Relation of cardiovascular disease and prostanoids

We analyzed plasma levels of prostanoids in cases of sudden death examined at forensic autopsy and investigated their relation to the cause of death. In cases of death due to cardiovascular disease, the mean ratio of 6-keto-prostaglandin F<sub>1</sub> alpha to thromboxane B<sub>2</sub> was significantly lower than in cases of death not due to cardiovascular disease.

#### **Publications**

**Takatsu A, Suzuki N, Hattori A, Shigeta A, Abe S.**

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**Inoue K<sup>1</sup>, Tanii H<sup>1</sup>, Abe S, Nishimura Y<sup>1</sup>, Kaiya H<sup>1</sup>, Okazaki Y<sup>1</sup>, Nata M<sup>1</sup> (<sup>1</sup>Mie Univ), Fukunaga T (Tokyo Med Examiner's Office).** The risk factors of suicide by poisoning among psychiatry department outpatients. *J Clin Forensic Med* 2006; **15**: (Epub ahead of print)

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