



Research Article

Determination of the Causality of 13 Chinese Municipal Cases of Death after Alcohol Drinking

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Abstract

Death after alcohol drinking commonly occurs. The direct cause of death in such cases is difficult to identify if they are accompanied by trauma, disease, inhalation asphyxia, and other complex situations, posing a challenge to forensic examiners. By reviewing police files, this study analyzes the causes of death in 13 alcohol-related cases reported to a Chinese municipal public security authority. The causes of death in the 13 cases can be categorized as asphyxia, drowning, trauma, and poisoning. Forensic examiners are likely to be confronted with particular difficulties if there is potential competition of death causes in alcohol-related cases. This study suggests that, for these cases, it is significant for forensic appraisal institutions to conduct comprehensive and systematic autopsies and poisoning (drug) tests in conjunction with full consideration of case facts, on-site survey findings, and other important aspects of the case at issue.

Keywords: Alcohol drinking; Acute alcohol poisoning; Blood alcohol concentration; Cause of death

Introduction

Alcoholic beverages are popular in many places worldwide. In the literature, a positive association has been reported between moderate alcohol consumption and fewer cardiovascular diseases [1,2], diabetes mellitus [3], and longer life span[4]. It is also found that moderate alcohol consumption contributes to an optimistic and positive lifestyle during the aging process [5]. Nevertheless, excessive alcohol intake can cause various alcohol-related diseases, for example, trauma

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due to falls [6]. A more severe situation is acute alcohol poisoning (AAP), which is drinking large amounts of alcohol in a short time, consequently leading to problems in the central nervous system that supports breathing, heart rate, and other basic life-support functions. It is also possible that one dies after heavy alcohol consumption. The World Health Organization reports that alcohol abuse leads to approximately 3.3 million deaths annually, accounting for 5.1% of total deaths [7]. Moreover, a study in a specific range of population showed that a large proportion of alcohol-related deaths are caused by AAP [8]. However, other causes such as inhalation asphyxia in alcohol intoxication can also lead to death, and the anatomical-pathological presentation of drunk dead bodies significantly varies from case to case. If death in alcohol intoxication is accompanied by inhalation asphyxia, trauma, disease, or other causes, the direct cause cannot be easily identified and thus pose a challenge to forensic appraisal institutions.

China has a long history of alcohol drinking culture, which often attaches meanings like one's integrity, loyalty, or competence to drinking. Possibly because of this, alcohol-related deaths occur often, and autopsy of drunk dead bodies is common in the practice of forensic examiners in China. Recently, China has also witnessed a yearly growing increase in complaints and grievances from individuals for reasons like discrepancies between forensic and clinical findings or between findings of different forensic institutions [9].

This is a retrospective analysis of alcohol-related death cases in 7 years reported to a Chinese municipal public security authority, Qinhuangdao Public Security Bureau of Hebei Province. Like the organ setting of other Chinese police authorities, it has its own forensic appraisal staff responsible for, among others, investigation and autopsy of abnormal deaths, which might involve criminal procedures. Consent for this study has been provided by not only the police authority but also the relatives of the deceased. The number of cases in this study is not extremely large, but they are somehow representative of the situation in other municipal cities of China. This study may help illustrate the particular difficulties forensic examiners are more likely to face in finding the direct cause of alcohol-related deaths.

Materials and Methods

The 13 cases of abnormal death after alcohol drinking were reported to Qinhuangdao municipal public security authority from 2012 to 2018. The analysis is conducted by reviewing case files kept by the police authority, including records of case notification, notes of visit and interview, findings by on-site survey, and medical inspection and appraisal documents, with particular examination on the sex and age of the deceased, autopsy findings, poisoning (drug) test results, and death causality identifications. Alcohol concentration in these cases was measured according to the amount of alcohol in the peripheral blood. It can be confirmed that the identity of all deceased was true, their drinking history was supported by investigation, and all dead bodies had passed through comprehensive autopsies and poisoning (drug) tests.

Results

Key facts

All 13 deceased were male, aged 27 to 49 years, including 1 aged between 27 and 30 years, 6 between 31 to 40 years, and 6 between 41 to 49 years. Of 13 dead bodies, 4 were initially discovered in their homerooms or dormitories, 4 were in river channels, and 5 were in outdoors other than river or lake areas. No obvious abnormality was found from the clothes of all the deceased. Key facts of the 13 cases can be found in Table 1.

Case number	Year	Sex	Age	Place of death	Blood alcohol concentration (mg/mL)	Death identification by the police authority
1	2012	Male	40	Indoor	3.46	Poisoning
2	2012	Male	31	Outdoor	2.74	Asphyxia
3	2012	Male	42	River channel	2.25	Drowning
4	2013	Male	33	Indoor	1.61	Poisoning
5	2013	Male	42	River channel	1.58	Drowning
6	2014	Male	37	Outdoor	0.89	Trauma
7	2015	Male	27	Indoor	3.19	Asphyxia
8	2015	Male	48	Outdoor	3.15	Trauma
9	2015	Male	35	Outdoor	3.9	Asphyxia
10	2016	Male	45	River channel	2.67	Drowning
11	2017	Male	43	Outdoor	3.83	Asphyxia
12	2018	Male	31	River channel	2.34	Drowning
13	2018	Male	49	Indoor	0.94	Trauma

Table 1: Key facts of 13 cases.

Autopsies

A comprehensive autopsy was conducted for each of the 13 cases. Foreign bodies, like food and mucus in the bronchial and smaller bronchial tubes, were evident in 4 cases, among which vomitus was visible near the corpses in 3 cases. As for the 4 cases initially discovered in river tunnels, there were signs of mushroom-like froth around the mouth and nose, aqueous emphysema, and pinpoint hemorrhages on the surface of eyelid conjunctiva, bulbar conjunctiva, and pulmonary mucosa. Diatom examination shows that, in the tissues of the lung and liver, there were species of diatom that are consistent with those in the water areas where the corpses were initially discovered. Injuries were easily visible in 4 cases. In 2 of these cases, head injuries and extensive subarachnoid hemorrhages were evident, with ruptures observed in the basilar artery; in 1 of 2 cases, histopathological examination revealed ruptured dissecting aneurysm in the circle of Willis at the base of skull. In 1 case, a large number of bruises in the absorption stage were found on the body surface, with a broken right 8th rib, approximately 1800 mL of hemoperitoneum, nodular surface of the liver, hemorrhage around the round ligament of the liver, contusion, and hematoma around the gallbladder. Moreover, histopathological examination revealed nodular cirrhosis. In another case, superficial bruises were noted on the head, and a great deal of broken glass, porcelain chips, and fallen honeycomb briquette furnace were found near the corpse, and scorching marks were evident on the body clothes. In 1 case, the dead body presented symptoms and signs of organophosphorus poisoning without any other obvious abnormality.

Poisoning (drug) tests

Peripheral blood was collected for alcohol testing, and stomach content and liver tissues were extracted for routine poisoning (drug) tests. Among the 13 cases, the minimum alcohol concentration was 0.89 mg/mL, while the maximum concentration was 3.90 mg/mL. In 1 case, dichlorvos was detected in the stomach content. In another case, the carboxyhemoglobin concentration was 58%.

Identification of death causes

Based on the results of forensic examination in conjunction with case facts and findings of police investigation, Qinhuangdao municipal public security authority determined the death cause for all 13 cases: inspiratory asphyxia in 4 cases, drowning in 4 cases, trauma in 3 cases, and poisoning in 2 cases. The specific correspondence between the cause of deaths and blood alcohol concentration is shown in Table 2.

Death cause	Blood alcohol concentration (mg/mL)				Total
	≤1.00	>1.00–2.00	>2.00–3.00	>3.00–4.00	
Inspiratory asphyxia	0	0	1	3	4
Drowning	0	1	3	0	4
Trauma	2	0	0	1	3
Poisoning	0	1	0	1	2
Total	2	2	4	5	13

Table 2: Blood alcohol concentration and death causality in 13 cases (number of cases).

Discussion

Death causality and blood alcohol concentration

Among the 13 cases of abnormal death after alcohol drinking, 4 cases of inspiratory asphyxia and 4 cases of drowning were supported by obvious corpse signs, which could eliminate death causality consideration such as mechanical injury and poisoning from organophosphate, tetramine, and other common poisonous substances. Despite the fact that 3 of 4 cases of inspiratory asphyxia were accompanied by high blood alcohol concentration, Qinhuangdao municipal public security authority excluded AAP as the direct cause in the light of the obvious corpse signs.

In 3 cases of trauma, injuries were found on the head of the deceased. The blood alcohol concentrations were 0.89 mg/mL, 0.94 mg/mL, and 3.15 mg/mL. Police investigation revealed a definite history of alcohol-related injury in each case. Although it is generally believed that the lethal blood alcohol concentration ranges from 3.50 to 5.00 mg/mL [10], forensic examination found cases wherein a blood alcohol concentration of 2.5 mg/mL causes death and cases of survival even at a blood alcohol concentration of 6 mg/mL [11]. In 2 of these 3 cases, the blood alcohol concentration was much lower than the lethal dose, and autopsies showed extensive subarachnoid hemorrhage, and ruptures could be observed in the basilar artery. Accordingly, the 2 cases of deaths shall be attributed to acute central nervous dysfunction caused by alcohol-induced brain injury, while alcohol was a triggering factor for subarachnoid hemorrhage. Although in 1 of 3 cases the blood alcohol concentration was up to 3.15 mg/mL, death due to intraperitoneal hemorrhage caused by external force in the upper abdomen could be noted by the combination of the extensive bruises

in the absorption period, broken rib, hemorrhage and contusion in the liver and gallbladder area, massive hemoperitoneum, and nodular cirrhosis shown by histopathological examination. Despite a low bleeding rate, alcohol intoxication blocked a self-rescue. Generally, the direct reason of death in alcohol-related cases accompanied by trauma or other diseases cannot be easily ascertained. For instance, it was reported in another municipal city in China that divergent forensic opinions arise as to whether the victim died of extensive subarachnoid hemorrhage after a blow on the head or fall during a drunk situation [12].

In the last 2 cases, the blood alcohol concentrations of the deceased were 1.61 mg/mL and 3.46 mg/mL respectively. In one of them, dichlorvos was detected in the stomach content. The police investigation found that after quarrelling with his neighbor, the man felt humiliated and drank a large amount of white spirit and then approximately 200 mL of dichlorvos and died when he went back to his neighbor's home. The man died of acute organophosphorus poisoning, the process of which was also a concealed suicide [13]. In another case where the dead body with evident scorching marks was found at his home in winter, the man had superficial bruises on the head, and broken glass, porcelain chips, and fallen honeycomb briquette furnace were found nearby. The carbon and oxygen hemoglobin concentrations in his body had reached to a lethal level of 58%, suggesting that he died of carbon monoxide poisoning under a drunk condition. The cause of death cannot be easily identified in cases involving alcohol abuse and poisoning concurrently. It was also reported in another city of China that a man died by blocking himself in the drunk status in his car with semi-combusted charcoal in a washbowl, even though content of neither carbon monoxide nor alcohol in his blood reached a lethal level [14].

Key points of forensic examination

The abovementioned analysis shows that, in alcohol-related cases accompanied by trauma, multiple poisoning causes, or other diseases, forensic examiners are likely to face more difficulties in finding the direct death cause. In such cases, the following points might be of reference value: First, a positive alcohol examination result does not render useless a comprehensive appraisal of other lethal factors. Although, at present, alcohol examination has been used as a screening program for routine poisoning (drug) test, this does not mean that a blood alcohol concentration at the poisoning or lethal level can disregard consideration of other poisonous (drug) substances or other death causes. Second, a comprehensive and systematic forensic pathological examination is the basis of identifying the causes of death. In 3 of 13 cases in this study, subarachnoid hemorrhage or hemoperitoneum was found by autopsy, and histopathological examination confirmed the presence of a disease. Thus, multiple causes of death were present in these cases, and alcohol drinking could be considered as an inducing factor for the occurrence of cardiovascular accidents. In performing a responsible forensic appraisal, such kind of cases should be carefully differentiated from those of head injury caused by blows. Third, individual differences should be fully considered. Even in cases where blood alcohol concentration does not reach the lethal dose, a conclusion of AAP-caused death can still be made on the basis of a comprehensive analysis of the age, drinking habit, habitual drinking amount, site of sample collection, elapsed time before examination, and other factors, if other causes of death can be excluded by autopsy.

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References

1. Rimm EB, Moats C (2007) Alcohol and Coronary Heart Disease: Drinking Patterns and Mediators of Effect. *Annals of Epidemiology* 17: 3-7.
2. Klatsky AL (1999) Moderate drinking and reduced risk of heart disease *Alcohol Research & Health* 23: 15-23.
3. Joosten M, Grobbee DE, Daphne L, Verschuren WM, Hendriks FJ, et al. (2010) Combined effect of alcohol consumption and lifestyle behaviors on risk of type 2 diabetes. *American Journal of Clinical Nutrition* 91: 1777-1783.
4. Li D (2008) Scientific drinking is good for health. *Liquor-making Science & Technology* 172: 133-138.
5. Rubio EG, Mauro IS, Ruiz CL, Ligia E, Prieto D, et al. (2016) Relationship of Moderate Alcohol Intake and Type of Beverage with Health Behaviors and Quality of Life in Elderly Subjects. *Quality of Life Research* 25: 1931-1942.
6. Afshar M, Netzer G, Afshar ES, Murthi S, Gordon S, et al. (2016) Injured Patients with very High Blood Alcohol Concentrations. *Injury*: 83-88.
7. World Health Organization, *Global Status Report on Alcohol and Health* (Geneva: WHO Press, 2014).
8. Baska T, Kluckova B, Komarekova I, Straka L (2016) Structure of deaths associated with heavy alcohol use and their contribution to general mortality in Northwest Slovakia. *International Journal of Public Health* 61: 545-551.
9. Zhang H (2018) An Analysis of and Strategies for Petitions Arising from Forensic Appraisals in Theories and Practice of Clinical Forensic Science 21, ed. Chinese Forensic Medicine Association (Harbin: Heilongjiang Science and Technology Press, 2018), 629-630.
10. Vonghia L, Leggio L, Ferrulli A, Bertini M, Gasbarrini G, et al. (2008) Acute Alcohol Intoxication. *European Journal of Internal Medicine* 19: 561-567.
11. Liu L, *Forensic Toxicology* (Beijing: People's Medical Publishing House, 2009).
12. Yu WF, Li Z (2016) The Forensic Analysis of a Death from a Head Blow After Drinking," in *Theories and Practice of Clinical Forensic Science* 19, ed. Chinese Forensic Medicine Association (Harbin: Heilongjiang Science and Technology Press: 91-92.
13. Wang C, Peng DY (2001) A Noteworthy Concealed Suicide Poisoning. *Forensic Medicine Magazine* 17: 221-222.
14. Chen J, Wang S (2016) The Forensic Analysis of a Death from Charcoal Burning After Drinking, in *Theories and Practice of Clinical Forensic Science* 21, ed. Chinese Forensic Medicine Association (Harbin: Heilongjiang Science and Technology Press: 394-395.



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