NOTES ON NATURAL HISTORY

A Debate on Pharyngolaryngeal Histopathologic Examination of the Cadaver Suspected of Pressure on Vital Elements of Neck: Death Cause

Fares Najari*, Babak Mostafazadeh, Mohamadali Emamhadi, Kazem Jahani

¹Department of Forensics Science, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Study Area: Tehran, Iran

Coordinates: 35°41'46"N 51°25'23"E

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Introduction:

Pressure on the neck is one of the oldest and controversial types of death. However, the only hypoxia as the cause of speed death is not always correct. Many victims die immediately without classic symptoms of respiratory failure (Shirzad & Gharedaghi, 2007). Most of the deaths which occur in less than one to three minutes are falls in this category. Pressure on the neck leads to airway obstruction, neck veins obstruction, blocking the carotid arteries, and affect the nerves. A variety of causes is associated with fatal pressure on the neck, including strangulation by hand, strangulation with a ligature, and hanging. Hanging is the method used maximally in suicide as compared to other methods of suicide (Graham *et al.*, 2000; Gould & Kramer, 2001). Including Iran, it is the most common method adopted for suicide in Asian countries (Morovatdar *et al.*, 2013; Shojaei *et al.*, 2014), especially adopted by men, older and especially illiterate people (Pridmore & Walter, 2013).

Our Survey:

In this observational analytic study, we selected the cases referring to Tehran Legal Medical Center during the year 2010 to 2014, suspected of pressure on vital elements of the neck and had a pharyngolaryngeal histopathologic examination. Selections were done by convenient sampling method and were properly evaluated. The study sample size was calculated at 88 by Cochran formula (as below) by considering alpha of 0.05, d of 0.1 and P of 0.65.

$$n = \frac{(Z_{1-\alpha/2})^2 p(1-p)}{d^2}$$

Inclusion criteria based on the corpse suspected of pressure on vital elements of the neck which consisted of cases having incomplete medical records. According to the reports of clinical observations, the results of histopathological examination of apparently healthy, suspicious and traumatized were separately investigated. Then, statistical analysis revealed the value of each case. The final result decided the necessity of sending the sample (apparently healthy, suspicious and traumatized). The cases having incomplete records were excluded from the study. To comply with ethical issues in this study, the confidences of the studied cases were not revealed.

Ultimately, after gathering the necessary information on 88 cases, data were analyzed by statistical software SPSS version 13. Chi-square and ANOVA tests were used and P-value less than 0.05 was considered significant.

Our Findings:

There was no link found between time from death and the location the corpse was found or autopsy findings, or the different reasons for referral with autopsy findings ($p > 0.05$). The mean age of cases was 33.4 years with a median of 33 and mode of 30 years.

We found (29.8%) were apparently negative revealed a negative histopathology; (38.6%) had a positive appearance and histopathology and (31.6%) with a suspicious appearance had a positive histopathology. In 48.7% of the studied case, apparent effects of ligature were found; in (12.5%) of the cases, the ligature was found with the bodies and in (23.9%) of cases, clear subcutaneous bruising was found. Age and gender had no effect on any of these factors ($p > 0.05$). Of 44 cases (77.2%) with a positive appearance, (99.5%) had a positive histopathological examination, which was significantly higher than cases with negative or suspected appearance ($p < 0.003$).

No statistically significant relationship was found between age or sex with histopathologic results ($p > 0.05$). The frequency of positive histopathologic results in patients with a Ligature effect was significantly more than others ($p < 0.001$). Frequency of positive histopathologic results was not significantly different between cases with and without ligature effect ($p > 0.05$). The frequency of positive histopathologic results with subcutaneous bruising was significantly more than others ($p < 0.001$).

Generally, all the basic pharyngolaryngeal tissue samples gathered from the corpse indicated pressure on vital elements of neck are usually send to the pathological laboratory. Indeed, such issue yet not been widely studied, thus the results of our study could prevent the unnecessary histopathologic examination. The traumatized cases (reporting positive pathology in all cases) should not be routinely forwarded for histopathologic examination. In addition, the study indicated the prevalence of age,

*Corresponding Author: fares.hospital@yahoo.com

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gender, underlying disease etc., as well as the association of each of these with such deaths. If the statistical analysis showed no necessity of histopathologic examination of the apparently healthy pharynx and larynx, it could also be concluded that this examination should be also stopped in suspicious cases to reduce the costs.

Table-1: Frequency of distribution of age for the cases suspected of pressure on vital elements of neck

P(%)*	Fre**	Age (years)	P(%)*	Fre**	Age (years)
4.5%	4	<10 years	18.2%	16	11-20 years
33%	29	21-30 years	20.5%	18	31-40 years
13.6%	12	41-50 years	10.2%	9	>51 years

Table 2. Frequency of distribution of sex on the suspected cases of pressure on vital elements of neck

P(%)*	Fre**	Sex	P(%)*	Fre**	Sex
46.6%	41	Male	53.4%	47	Female

*Percent; **Frequency

Table 3. Frequency for distribution of the histopathologic results in suspected of pressure on vital elements of neck cases

Negative histopathology	Positive histopathology	Sex
3 (12.5%)	21 (87.5%)	Male
10 (30.3%)	23 (69.7%)	Female

Others' Work:

As per a study in Turkey, which reported death with the ligature in 47 cases of murder and 19 cases of suicide; the histology was also found positive in 25 cases of murder and all 19 cases of suicide. Tissue damage in the laryngohyoid area was evident in 21 cases of murder and two cases of suicides (Demirci *et al.*, 2009). Further, in the United States, 70 death cases which were due to the pressure on the neck, was reported as the conditions with the uncertain cause of death (murder or suicide) (Clément *et al.*, 2011). In South Africa (Godin, *et al.*, 2012) among 130 cases of death due to pressure on the neck, it was found that 87 cases of death were due to suicide and out of which 73 referred cases, the macroscopic examination also concluded to the same cause. Concludingly, the suspicious cases were seen to had a greater necessity for histopathologic examination. In two studies with large sample sizes in Canada and Germany (Maxeiner & Bockholdt, 2003; Pollanen, 2001) nearly 1,000 deaths caused by pressure on the neck. The value of histopathological examination in their suspicious cases was similar to our study. In a study in Poland on 46 cases of death due to pressure on the neck, like our study, the suspicious cases in macroscopic evaluation needed histopathologic examination (Okłota *et al.*, 2011). The strength of our study was using proper regression analysis and its greatest weakness was its low sample size. The efficacy of histopathologic examination in cases of death due to pressure on the neck that was suspicious in the macroscopic evaluation was also observed in other studies

that had a small sample size about 20-30 and is thus less comparable with others (Demirci *et al.*, 2009; Wöllner, *et al.*, 2015). Any other useful study in this field was not found. The main drawback of the above-mentioned studies while compared to our study, was the low generalize ability of the results and the strength was the desirable sample size. and the most important limitation was not adjusting the confounding variables. Of course, we did not examine the details of pathologic findings in our study, which can be evaluated in future studies.

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