Obscure Death And Bronchial Asthma

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Abstract:
Obscure death (OD) is a medico-legal dilemma; and it had not been well covered in the literature. It could be real OD if no cause was achieved after having all relevant data and conducting a complete standard autopsy followed by a series of complementary investigations. Or it could be relative OD if one or more of those important procedures or investigations were not performed, whatever were the circumstances.

We had studied retrospectively, in detail, most of the parameters and variables related to obscure death cases in our institute for the period 01.01.1981-31.12.1992 inclusive, to find any correlation or association or not. And coupled with revision of the relevant literature, we had then discussed our results. Within that period studied, out of a total of 1445 autopsies (average autopsy rate was 120 autopsy per year), there were 106 cases of obscure death. Average OD rate in our institute was 7.34%.

In fact, average OD rate is always below 10% (2.4% real, 7.34% relative).

From our obscure death cases (N=106) we shall present two cases, where the difficulty to certify the cause of death as bronchial asthma is there. Often the forensic pathologist, if objective and unbiased, will label such cases as obscure death cases.

Keywords: obscure death, bronchial asthma – postmortem, diagnosis.

Introduction:
Bronchial asthma could be defined as a reversible obstructive lung disorder characterised by increased responsiveness of the airways.1 It occurs with a prevalence rate of 6-12% in children and 6-8% in adults.2 Etiologically, the asthmatic attack could be present due to an intrinsic idiopathic (nonallergic) process which accounts for about 30-50% of asthmatic cases, most likely as a result of imbalance between adrenergic and cholinergic control on respiratory airways, or due to an extrinsic (allergic) process, mostly in child and young age group.1 In some people the two processes coexist.

Asthmatic attacks could be precipitated by stress, emotional upset, infection (in particular respiratory infections), exercise, extremes of weather, like severe cold, irritants, and ingestion of some food or drugs. Of the known allergen in asthma are airborne pollens, house dust and animal danders. Bronchial asthma is a frequent cause of sudden unexpected death, with up to one-fourth of deaths occurring within 30 minutes of onset of the attack, (3). In its aggravating attack, i.e status asthmaticus, death could happen suddenly without long deterioration and without clear seasonal variation. Most of the asthmatic deaths (60-80 %) occur at home at night. In fact, nocturnal death is a known observation in asthmatic death (3, 4) and there is an increased risk of death from asthma at night or in the early morning, most likely due to variation in the air flow. Often there is past history of asthma associated with familial predisposition.

Respiratory deaths account to about 23% of sudden unexpected death.3 While death rate from asthma approaches 1.1-7% in blacks are twice as in whites.3,5

Material and methods:
We have studied retrospectively In detail most of the parameters and variables related to obscure death (OD) cases (medico-legal autopsies) In the UILM (University Institute of Legal Medicine - Lausanne, Switzerland), our Institute, for the period 01.01.80 to 31.12.92 inclusive (i.e. within complete 12 years), to find any correlation or association or not. And completed with revision of the relevant literature, we have discussed our results.

Within that period studied, out of a total of 1445 autopsies (average autopsy rate was 120 autopsies per year), there were 106 cases of obscure death. Average OD rate in our institute was 7.34%. In fact, average OD rate is always below 10% (2.4% real, 7.34% relative).

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Results and discussions:
From our obscure death cases (N=106) we shall present two cases, where the difficulty to certify the cause of death as bronchial asthma is there. Often the forensic pathologist, if objective and unbiased, will label such cases as obscure death cases.

First Case: (A 20/84)
An employed divorced white female, aged 41 years, living alone. Known case of chronic asthmatic bronchitis with allergy to hair of cat, and in spite of that she is living with a lot of cats. Not regular on treatment. Her treating doctor has been called upon urgently to visit her at home many times during the asthmatic attacks. Found dead by a family member (but unwitnessed death) in advanced putrefied stale, in supine position in corridor at her home. Last activity was unknown. Examination of scene of death was conducted by a colleague from our institute. Major trauma was excluded, but rather heteroagression is difficult to exclude (especially in the region of neck). Hyoid bone and larynx were intact. Histopathological examination was not performed because of putrefaction. Toxicological analysis was not done because of the putrefied state of specimens, and in the mean time the judge had not requested that examination. Alcohol level in peripheral blood was 0.88g o/oo, which may be attributed partly to putrefaction. In this case, the cause of death was not determined because of advanced putrefaction, but major trauma was excluded. So hypotheses are still therefore:
- natural disease process (physiological or non physiological) leading to death, e.g. cardiac arrhythmias, myocarditis, pneumonia. etc..., but the most probable natural process here is the status asthmaticus.
- overdose of bronchodilator and other medications for asthma, or other intoxication, where toxicological examination was not performed.
- violent death in the form of strangulation or throttling (by hands) which is difficult to exclude due to advanced putrefaction.

Second Case: (A 138/89)
A man aged 56 years, teacher, married, with past history of cardiac disease and episodes of bronchial asthma. He had fallen down and died in front of his wife at his home, some time after unpleasant visit of another person with whom he had indulged in a verbal conflict.

In the previous two cases, the age (41 and 56 years) lies in the later age group (40-60 years). It is known that asthmatic fatalities are often encountered in persons above 40 years. Both cases died at home. Toxicological analysis was not performed in both cases.

Some aspects of asthmatic deaths:
1. Poor compliance:
In some situations, asthmatic deaths could be attributed to misuse of bronchodilator aerosoles, an inadequate or delayed assessment and treatment. The common problem of poor compliance is often evidenced by postmortem subtherapeutic or absent level of medications. It is a usual scene to discover a dead asthmatic grasping an aerosole (mostly empty one) in the hands, and even grasped due to cadaveric spasm.

2. Death by vagal cardiac inhibition reflex:
Vasovagal inhibition reflex with end result of death due to cardiac arrest. could happen with sudden irritation of pharyngeal mucosa from the aerosole especially when used suddenly and forcefully by an anxious patient in status asthmaticus. Vagal shock during emotion may cause death in asthma as it is the situation of the second case (A 138/89) already presented.

3. Asphyxiation:
Asphyxiated death in status asthmaticus occurs as a result of obstruction of airways by bronchoconstriction and thick tenacious mucus.

4. Pneumothorax:
Rupture of emphysematous bullae often leads to total tension pneumothorax.

5. Iatrogenic effect:
There is a wide controversy as regards the relation of the increased asthmatic deaths with the increased sales of bronchodilators. But according to a study done by MoriId and Giertsen, 1988, they have found a strong association between asthmatic death and excessive use of bronchodilators. That paradox of the increased asthmatic death in comparison to the increased treatment facilities and medication had been discussed in the literature. It was clear from witnesses of families that asthmatics tend to use higher doses of potent drugs than prescribed, so over dosage of bronchodilator aerosoles is often encountered.

Of the known complication of medication of asthma, parenteral injection of theophylline and its derivatives are well known to predispose to cardiac arrest, while over dosage of sympathonhimehtics provoke ventricular hyperexcitability and cardiac arrhythmias. As
well, the combination of the theophylline and sympathomimetics lead to ventricular fibrillation.

6. Obscure death:
During autopsy, in many cases there are no specific pictures of asthmatic death. In a small group of cases we can find signs of a long-standing condition in the form of overdistended voluminous lungs (especially if cardiopulmonary resuscitation was not done), in addition to sticky mucous secretion in bronchi and bronchioles. Morild and Giertsen, 1988, in their study of sudden asthmatic deaths (11 cases), had emphasized a relative right-sided hypertrophy of heart in the studied cases. Histopathological examination does not show always the classic signs of bronchial asthma. Most of the findings indicate a long standing situation, rather than an acute attack. If we are lucky to find typical classic signs of bronchial asthma, we could find the following:

- thick tenacious mucous and mucoid plugs till distal bronchioles.
- thickened basement membrane of bronchi with a wavy appearance.
- hyperplasial of smooth muscle in bronchi, and bronchioles.
- eosinophilic inflammatory infiltration in the walls of bronchi.
- foci of atelectasis.
- signs of emphysematous chest (over distended or even ruptured alveoli).

Often, in obscure death, there are no evidences in postmortem (external or internal) examination or any other favourable data from complementary laboratory investigations, to support the hypothesis of death by status asthmaticus. However, the past medical history of asthma could give hints about such hypothesis. In addition to that, the presence of medical documentation (clinical assessment, pulmonary function tests, allergy tests, treatment plan), especially if there was a terminal hospitalisation at the time of attack, just before death, it is useful to formulate such postmortem diagnosis. In fact, we should be very cautious to formulate a postmortem diagnosis in such a manner depending solely on past medical history. It is not necessarily that an asthmatic should die always because of asthma, as death could happen from any other cause.

Postmortem blood analysis is important to evaluate the case whether medication was taken (in therapeutic close or not) or not, and to estimate biochemical parameters such as, partial arterial tension of oxygen (Pa O₂), partial arterial tension of carbon dioxide (Pa CO₂), and pH. In a typical case, Pa O₂ is low, Pa CO₂ is high, and pH is low (metabolic acidosis). In fact, we are not lucky all the time to find cadavers in fresh situation, which is a usual finding in cases of obscure death, so there is no utility of postmortem blood analysis.

Conclusions and recommendations:
We have the opinion that if there are no specific findings in the autopsy and we have negative results in laboratory investigations, it is not logical and preferred to rely solely upon past medical history to formulate a postmortem diagnosis of death by bronchial asthma. In addition, if there are difficulties in establishing such a postmortem diagnosis, due to advanced state of putrefaction, nonperformance of histopathological or laboratory examinations, the case is labeled as relative obscure death and the door is left open for all the possibilities.

References: