

Letter to the Editor—Commentary on the So-Called Spontaneous Human Combustion Phenomenon

Sir,

We were very interested by the case of “human spontaneous combustion” reported and well illustrated by Levi-Faict and Quatrehomme. We would, however, like to bring some precisions based on our own experience and to complete the analysis made on this rare phenomenon. If we consider the definition given in conclusion by these authors of “isolated body combustion,” we have in our archives four recent files of deaths (between 2007 and 2010) answering this criterion. The characteristics of the victims, the circumstances and the environment of the bodies’ discovery (importance of damage to property caused by flames), the noticed injuries, and the results of histological and toxicological analyses are summarized in Table 1. First of all, these four cases distinguish two types of situations:

- The “body combustions” that were “isolated” by the quick intervention of help with a fast confinement of the fire preventing its distribution to the environment (cases 2 and 4),
- The “body combustions” that were “isolated” by the spontaneous extinction of the fire localized at the body (cases 1 and 3).

The case described by the authors corresponds to the second situation. Like them, we think that the phenomenon, historically described as “spontaneous human combustion,” should rather be called “isolated body combustion,” but with an additional precision making reference to the “spontaneous” adjective qualifying, originally, the process: “with spontaneous extinction.” Indeed, in our opinion, our victims 2 and 4 do not answer exactly the description of the phenomenon, as far as the fires were confined at the bodies by the intervention of firemen. Without this intervention, the damage would have been much more important within the house. Nevertheless, in these two cases, the ignition began at the level of the bodies, which is the reason for using these files in our analysis.

The victims correspond to four women, of 61 middle-aged years (extremes: 44–74 years); three lived alone, and all were alone at the time of the incident. The carbonized body’s surface mean was 88.75% (extremes 70–98%) with exposure of osseous parts in three cases (skull [case 2], ribs [case 4], pelvis [case 1], femur [case 1], and tibiae [case 4]). At the time the fire started, two of them were lying on a sofa or on a bed (cases 2 and 4), victim 1 sat on a chair, and victim 4 leaned up. The autopsies showed proof of respiratory movements after the beginning of the cremation (soot in the superior airways) in two cases. In case 3, the macro- and microscopic examinations suggested death due to an acute heart failure and postmortem carbonization. The toxicological analysis showed an elevated blood alcohol level in one case (case 1), positive rates of cyanide in two cases (cases 1 and 2), and therapeutic rates of sedative drugs in two cases (cases 1 and 3). For three cases, the death was directly attributed to the fires. In three cases, the results of the police inquiries attributed the start of fire to incandescent cigarettes.

From these observations, we think that the phenomenon of “spontaneous human combustion” is rare because in order to occur, it requires a conjunction of characteristics and particular circumstances.

Characteristics of the Victims Favoring the Phenomenon*Pathological Circumstances*

As specified in the authors’ review in some cases, we find for victim no. 1, a high rate of blood alcohol (3.41 g/L). The alcohol consumption (whiskey) can explain uncoordinated movements and lack of judgment or behavior supporting the hypothesis that the victim put herself at risk when using matches or cigarettes; additionally, a lack of consciousness may have caused her to fall onto such objects, with an incapacity to extinguish the fire. For this case, we also think that alcohol spilled onto the clothes may have played the role of accelerant and to facilitated the fire.

Victims no. 2 and 4 suffered from multiple sclerosis—an important physical handicap that reduced their mobility. For these two victims, the pathological state seems to have played a major role in the combustion of bodies by hindering these women from escaping the fire. The third victim succumbed to an acute heart failure because of an ischemic cardiomyopathy before the ignition. So, three factors favoring this phenomenon of isolated body combustion and connected to the victims can be highlighted:

- Physical incapacitation of toxic origin (alcohol, sedative substances),
- Heavy physical handicap, and
- Sudden death of “natural” origin.

Social Circumstances

As underlined by the authors, the solitude (at least at the time of the fire) and the social isolation are found in cases 4 and 3, respectively. This isolation explains the absence of fast intervention and the importance of the noticed burns. For our case 3, combustion occurred within 1 hour (time of the absence of the victim’s daughter), suggesting a “brief” but intense release of heat.

The Composition of Clothes

The composition of clothes with particularly flammable textiles (cotton, viscose, polyester, hemp, and acrylic) could be also evoked. The demonstration is, however, relatively difficult to make in a retrospective way considering the fact that the carbonization is often very substantial with few or no fragments of clothes found in the examination. The type of clothes (ample, not skin-tight) could also facilitate the fire by assuring a better oxygenation and a more complete combustion.

Characteristics of the Environment Favoring the Phenomenon

For our four cases, the rooms where the victims were found were relatively large, “aerated,” not confined, so favoring complete combustion. For victims no. 1 and 2, while the soot found in the superior airways testifies to respiratory movements after the release of the fire, the low rates of carboxyhemoglobin tend to prove the poor release of carbon monoxide during the combustion. The rates of cyanides, of delicate interpretation as underlined by the authors, support, however, the hypothesis that the victims were alive at the start of the departure of the fire.

TABLE 1—Summary of victim characteristics, circumstances and environment of the bodies' discovery, injuries, and results of histological and toxicological analyses.

No.	Characteristics of Victims	Intervention of Fire Brigade for the Extinction of the Fire	Spatial Repartition of Injuries Caused by Flames	Autopsy Findings and Histological Results	Toxicological Results	Pathology Having Been Able to Contribute to the Combustion	Environment	Cause of Death	Source of Heat and Accelerating
1	Caucasian woman, 55 years old, 1 m 55, 60 kg, living alone, found carbonized on a chair in the main room of her house (Fig. 1)	No	Carbonization spreads cutaneous surface of 97% of the body's surface sparing toes Exposure of lumbar and glutei muscles Exposure of the iliac bone and fracture of right femur with diaphyseal issue	Cherry-red coloration of muscles and internal organs Soot in the larynx and the trachea Erythema of superior airways mucosa Histology: soot, congestion, and coagulation of bronchial epithelium Hepatic steatosis	Alcohol blood level : 3.41 g/L Carboxyhemoglobin = 6.6% Cyanide = 0.7 mg/L Bromazepam = 0.02 µg/mL Méprobamate = 2.5 µg/mL Citalopram = 0.34 µg/mL Cyamémazine = 0.03 µg/mL	Ø	Carbonization of elements adjoining the body Dog found dead (cyanide intoxication without burns)	Cyanide poisoning and vast burns	Cigarettes Whiskey
2	North African woman, 44 years old, 1 m 60, 55 kg, living alone, handicapped, moving in wheelchair, found carbonized on her sofa (Fig. 2)	Yes Fire brigade called by witnesses noticing black smoke in the apartment Intervention having allowed a fast control of the fire confined in the sofa	Carbonization of skin on 90% of the body's surface sparing the perineum, the neck, the right scapular region, the gluteal region, both heels Exposure of the right frontal and temporal bones	Soot in the larynx up to 4 cm below the glottic plane Congestion of superior airways mucosa Histology: soot, congestion and coagulation of bronchial epithelium Focal areas of cerebral periventricular demyelination	Alcohol blood level = 0 Carboxyhemoglobin = 8.5% Cyanide = 1.78 mg/L	Multiple sclerosis	Carbonization of the sofa and the neighboring wall	Cyanide poisoning and vast burns	Cigarettes
3	North African woman, 74 years old, 1 m 60, 75 kg, living with her daughter (absent at the time of the fire), found carbonized on the floor of the kitchen	No	Carbonization of skin on 70% of the physical surface sparing the perineum, the lumbar region, gluteal area, the legs and the feet Exposure of the muscles of the left hand	Normal airways mucosa	Alcohol blood level = 0 Carboxyhemoglobin < 0.1% Cyanide < 0.1 mg/L Lormetazepam = 0.007 µg/mL Mianserine = 0.05 µg/mL Cetiprotol = 0.07 µg/mL Fentanyl = 0.76 ng/mL	Coronary atherosclerosis (stenosis of 75% of the lumen of anterior interventricular and circumflex arteries) Scars in left myocardial ventricular wall infarct	Carbonization of the ground under the body	Acute heart failure due to chronic ischemic myocardopathy	Matches
4	Caucasian woman, 71 years old, 1 m 50, 48 kg, handicapped, living alone, found carbonized in her clinic bed	Yes Fire brigade called by witnesses noticing black smoke in the apartment Intervention having allowed a fast control of the fire confined in a clinic bed	Carbonization of skin on 98% of the body's surface sparing only the left parietal region of the scalp. Opening of the right pleural cavity with carbonization of ribs and right lung, exposure of the carbonized right lobe of the liver, carbonization of the fingers of both hands with disappearances of the last phalanges Exposure of both tibias with carbonization	Erythematous laryngeal, tracheal and bronchial mucosa without soot deposits	Not available	Multiple sclerosis	Carbonization of the mattress	Vast burns ± poisoning cyanides	Recognized important addiction to smoking

TABLE 2—Main features of isolated body combustion.

	Antemortem Combustion	Postmortem Combustion	Common Elements to Both Situations
Risk factors	Toxic incapacitation (alcohol, sedative substances) Heavy handicap limiting mobility	Pathology explaining a sudden death	Social isolation Bearing of flammable clothes Vast and airy room Source of heat or device of ignition in the room (not necessarily found)
Elements of orientation			
Circumstances of bodies discovery	Victim found on a chair, a sofa or in a bed	Victim on the floor	Only one victim or presence of a pet died near the body
Autopsy findings	Erythematous airways mucosa Soot in larynx, trachea, and bronchi	Normal airways mucosa No soot Pathological finding explaining the death	Diffuse carbonization of the skin on more than 50% of body's surface with possibility of internal organs and bones exposure
Histological results	Congestion of airways mucosa Coagulation of tracheal and bronchial epithelium Soot deposits in airways	No sign of airways burns nor soot deposit	Absence of vital reaction around the cutaneous burns because of the speed of their constitution and the death
Toxicological results	Carboxyhemoglobin > 0 but very low levels Cyanide > 0	Carboxyhemoglobin < 0 Cyanide < 0	Alcohol +/- Sedative drugs +/-



FIG. 1—Photographs of body (A) and fire scene (B) of victim no. 1, illustrating a well-confined fire at the body. On the right, the white arrows show an ashtray and a packet of cigarettes.



FIG. 2—Photographs of the nearby environment (A) and the body (B) of victim no. 2 with an ashtray on the table (white arrow).

We thus think that the phenomenon known as “spontaneous human combustion” and which would rather be called “isolated physical combustion” with or without “spontaneous extinction” includes several situations summarized in Table 2. For each, favoring factors exist and forensic arguments must be systematically looked for.

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