

Pitfalls Encountered during Documentation of Cases of Fatal Fall from Height Presented to Kafr EL Sheikh-Medico legal Department during the Period from (1999 to 2013)

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Abstract Fall from height represents an important form of blunt trauma in society. The incidence of deaths due to fall from height is increasing day by day. So, determination of the manner of fatal fall from a height is very important issue. When establishing the mode of death, it is essential for the forensic pathologist to reconsider autopsy findings, outcome of toxicology screening, and circumstances at the death scene.

The present study aimed first, at throwing light on the pitfalls encountered during examination of medico legal (ML) reports of cases of falling from height. Second, design a ML protocol for documentation of deaths due to falling from height.

The current study was a retrospective study of the records of cases of fatal fall from height presented to Kafr EL Sheikh-Medico legal Department during the period from 1st of January 1999 till the 31st of December 2013. The records were examined for: personal data, detailed history of the cases, scene examination, autopsy findings and Toxicological screening.

The results of the present study showed that the total number of the reported cases was 21 cases. The age of the victims ranged from 8 to 69 years, males presented (61.9%) of cases. Data about employment was documented in only (38.1%) of cases. Data about the circumstantial events were missing in most of the records. Accidental falls were the most prevalent manner. Suicidal falls were the second prevalent manner. Scene examination revealed that falls of (71.44%) of cases was from buildings. The height of fall was found in majority of records to be from the 4th storey. Examination of the path of fall was not reported in most of cases (95.23%). The nature of impact surface was documented only in (38.1%) of cases. Body orientation in relation to impact surface was mentioned in (38.1%) of cases. Records describing the site of fall from inside were very defective. The presence of barrier and its height was reported in (33.33%) of cases. Whole body radiography and external body measurements were not performed in any of the studied cases. Autopsy findings showed that the head and the thorax were the most affected regions. The probable primary site of impact was concluded by autopsy in (47.62%) of cases. The cause of death was head injuries in the majority of cases either by itself or in conjunction with other injuries. Toxicological screening of the commonly used drugs was carried in (90.48%) of the cases, where it was negative in (85.72%) of cases. Blood alcohol content was performed in (61.9%) of the cases and it was negative.

The study concluded deficient documentation of data about the history of the cases; scene examination, autopsy findings and toxicological screening. Many recommendations were suggested and a protocol for documentation of the cases of fatal fall from height was proposed.

Introduction

Fall from height refers to fall from one higher level to another level involving ladder, stairs, roof, etc. High fall injury refers to the injury elicited by human body falling from height and bumping onto the ground (Murthy, 1999).

Death due to falls from a height constitutes a

distinct phenomenon which is seen mostly in any urbanized locality dominated by high rise apartments (Weilemann et al., 2008).

The incidence of deaths due to fall from height is increasing day by day with the increased work activities like maintenance, construction, painting,

decoration and window cleaning . Moreover, such jobs are performed without proper training, planning or safety measures (Törö et al., 2006).

Not only the height of fall is the exclusive factor controlling the magnitude of injuries, other mechanical factors have a great influence on the resultant injuries e.g. age of the victim, the course of the fall, kinetic energy of impact, duration of impact and, the hardness of the contact surface (Peitzman et al., 2012).

It is often unclear in fall deaths whether the manner of death is accident, suicide, or homicide. These pose problems for the medico legal experts as reliable eye witness evidence will not be available. Postmortem findings have to be considered within the framework of the subject's social, medical, and psychiatric history in conjunction with findings at the death scene and toxicology results to obtain the clearest possible picture of the circumstances of death (Prathapan and Umadethan, 2015).

Aim of work

This study aims first, at throwing light on the pitfalls encountered during medico legal reporting of cases of falling from height. Second, proposes a ML protocol for updating the documentation of the cases of fatal fall from height presented to Kafr EL Sheikh-Medico legal Department.

Materials and methods

It is a retrospective study of the records of fatal cases of fall from height brought to the mortuary of Kafr El Sheikh-Medico legal Department over a period from 1st of January 1999 to the 31st of December 2013. The total number of cases during this period was 21 cases (2.3 % of the total autopsied cases /year).

The following data have been looked up in the prosecutor preview reports:

Personal data:

age, gender and employment state.

Circumstantial events of fall:

social problems, medical illness, psychiatric diseases and previous suicidal attempts.

Preliminary manner of death Scene examination:

- **Site of fall from outside as regards:** nature of the place, height and path of fall.
- **Site of final impact as regards:** horizontal distance between the body and the building, nature of impact surface and body orientation in relation to the impact surface.
- **Site of fall from inside as regards:** available pre-fall running area, signs of struggle, suicidal note, presence of barrier (e.g. fence) and its height.

Autopsy findings data that have been looked up in

the forensic pathologists reports: whole body radiography, external body examination, pattern of

injuries, cause of death, and toxicological analysis for alcohol and other antipsychotic drugs.

Ethical considerations

Approval was obtained from the responsible authorities of Kafr El Sheikh-Medico legal Department to recruit these data for research work. All the collected data were kept confidential and anonymous all through the study. The approval of the Ethical Committee of The Faculty of Medicine Ain Shams University was obtained.

Statistical analysis: percentages were applied for the analysis of the collected data.

Results

Personal data

As regards age and gender of the studied cases:

Figure (1) shows that most the victims of falling from height were males (61.9%) who lie in the age group between (> 30 up to 40 years), while most of the females lie in the age group (>20 up to 30 years).

As regards the employment state and circumstantial events of fall:

Table (1) shows that the employment state was documented in only (38.1%) of victim's records. While the circumstantial events were documented as follows: social problems and medical illness (9.52%) for each, psychiatric disease documented in only (14.29%) of cases, while previous suicidal attempts were reported in only (9.52%) of files.

Preliminary manner of death:

Table (2) shows that the percentage of the accidental deaths of falling from height was (52.38%); the percentage of suicidal deaths was (23.81%), while the percentage of homicidal deaths was (14.29%). The manner of death was questioned in (9.52%) of the studied records.

Documentation of scene examination including:

- Site of fall from outside as regards:

- *Nature of the place from which falling occurs:*

Figure (2) shows that the incidence of falling from building was the highest, as it represented (71.44%). Accidental falls were the commonest manner of death from buildings as shown in (33.33%) of the studied cases. On the other hand, homicidal victims represented (14.29%). Construction sites represented (9.52%) of the documented places of fall, where accidental manner of death was the only recorded manner. Other places of fall (electric pole, stairs and sanitary pit) were present in (19.04%) of fall places. Accidental falls were present in half of these cases.

- *Height of the place from which fall occurred:*

Figure (3) concluded that most of fatal deaths of the studied cases was the fourth storey and mostly was an accidental manner.

- *The path of fall:*

Table (3) shows that the description of the path of fall was documented in only one of the studied cases (4.76%) and it was free from any possible obstacle.

- **Site of final impact as regards:**
 - *The horizontal distance between the final position of the body and the building:*

Measurement of the horizontal distance between the final position of the body and the building was missed in all the records of the studied cases.

- *The nature of impact surface and the resultant body orientation:*

Table (4) shows that the nature of impact surface as being hard and solid was only documented in (38.1%) of the studied cases. Body orientation in relation to the impact surface was described in only (38.1%) of records, (14.29 %) of the described cases were lying on their front, while (23.81%) of victims were lying on their back.

- **Site of fall from inside :**

Table (5) shows that the documented description of the site of fall from inside was only present in eleven cases (52.38%); this description included the presence of barrier, documented in (33.33%) of cases, as well as the height of this barrier was mentioned in only (19.05%) of cases.

Autopsy findings

- **Documentation of Whole body radiography** was missed in all the records of the studied cases.

- **External body examination** including the exact length of the victims in centimeters, center point of gravity and body mass were missed in all the records of the present study.
- **As regards the pattern of injuries: table (6)** shows that the head and thoracic injuries were the most frequent injuries detected during autopsy as it was present in (85.71%) for each. Abdominal, pelvic as well as extremities injuries came in the second order (80.95%).
- **As regards the primary impact site: figure (4)** shows that in the studied cases, the primary site of impact of falling from height was the front and the back of (19.05%) each. The head and the feet were documented as the sites of primary impact in (9.52%) of cases.
- **Determination of the Cause of death** by autopsy was presented in **figure (5)** as follows: the most frequent cause of death was head injuries (28.57%) , the least frequent cause of death detected was the combination of head and spinal injuries as it was present in only (4.76%) of cases.
- **As regards toxicological screening: table (7)** shows that blood analysis for alcohol was performed for 13 cases (61.90%) and it was negative for all these cases. Analysis for psychotropic drugs was performed for 19 cases (90.48 %) but was only positive in one case.

Table (1): The distribution of documented status of employment and the circumstantial events among the studied cases of falling from height (n=21).

	<i>Number of documented cases</i>	<i>Percent (%)</i>
<i>Employment state</i>	8	38.1
<i>Circumstantial events of fall</i>		
<i>Social problems</i>	2	9.52
<i>Medical illness</i>	2	9.52
<i>Psychiatric disease</i>	3	14.29
<i>Pervious suicidal attempts</i>	2	9.52

Table (2): The distribution of the studied cases of falling from height according to the preliminary manner of death (n=21).

<i>Manner of death</i>	<i>Cases</i>	
	<i>Number of cases</i>	<i>%</i>
<i>Accidental</i>	11	52.38
<i>Suicidal</i>	5	23.81
<i>Homicidal</i>	3	14.29
<i>Questioned manner</i>	2	9.52
<i>Total number of cases</i>	21	100

Table (3): The distribution of the studied cases of falling from height according to the description of the path of fall (n=21).

<i>Path of fall</i>	<i>cases</i>	
	<i>Number</i>	<i>%</i>
<i>Documented</i>	1	4.76
<i>Not documented</i>	20	95.23
<i>Total number of cases</i>	21	100

Table (4): The distribution of the studied cases of falling from height according to the nature of impact surface and the resultant body orientation (n=21).

<i>Nature of impact surface</i>	<i>Cases</i>	
	<i>Number</i>	<i>%</i>
<i>Documented</i>	8	38.1
<i>Not documented</i>	13	61.9
<i>Body orientation in relation to impact surface</i>		
<i>Front</i>	3	14.29
<i>Back</i>	5	23.81
<i>Not documented</i>	13	61.9
<i>Total number of cases</i>	21	100

Table (5): The distribution of the documented site of fall from inside among the studied cases of falling from height (n=21).

<i>The site of fall from inside</i>	<i>Number of documented cases</i>	<i>%</i>
<i>Available pre-fall running area</i>	0	0
<i>Presence of barrier</i>	7	33.33
<i>Height of barrier</i>	4	19.05
<i>Suicidal note</i>	0	0
<i>Signs of struggle</i>	0	0

Table (6): The distribution of the studied cases of falling from height according to their injured body regions, detected during autopsy (n=21).

<i>Injured body region detected by autopsy</i>	<i>Cases</i>	
	<i>Number</i>	<i>%</i>
<i>Head</i>	18	85.71
<i>Neck</i>	3	14.29
<i>Thorax</i>	18	85.71
<i>Abdomen and pelvis</i>	17	80.95
<i>Extremities</i>	17	80.95

Table (7): The distribution of the studied cases of falling from height according to the documented results of toxicological screening (n=21).

<i>Results of toxicological screening</i>	<i>cases</i>					
	<i>Documented</i>				<i>Not documented</i>	
	<i>Positive</i>		<i>Negative</i>			
	<i>no</i>	<i>%</i>	<i>no</i>	<i>%</i>	<i>no</i>	<i>%</i>
<i>Blood alcohol content</i>	0	0	13	61.90	8	38.10
<i>Commonly used drugs</i>	1	4.76	18	85.72	2	9.52

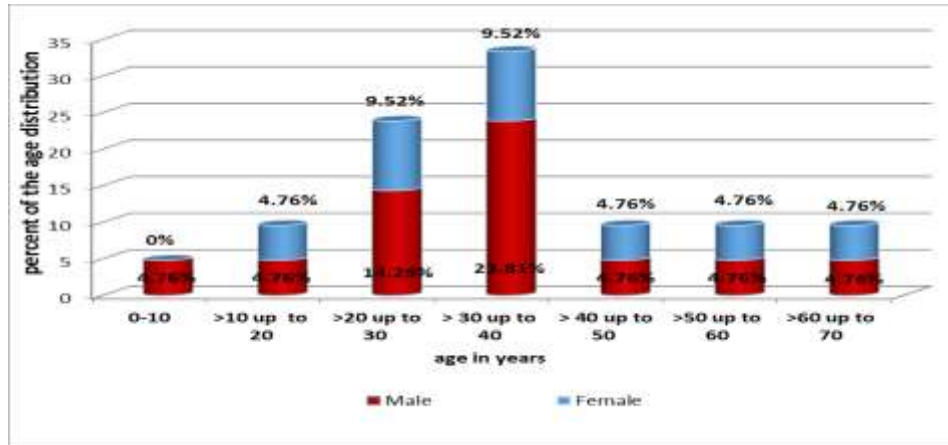


Figure (1): Histogram shows the distribution of the studied cases of falling from height according to the gender and age (n=21).

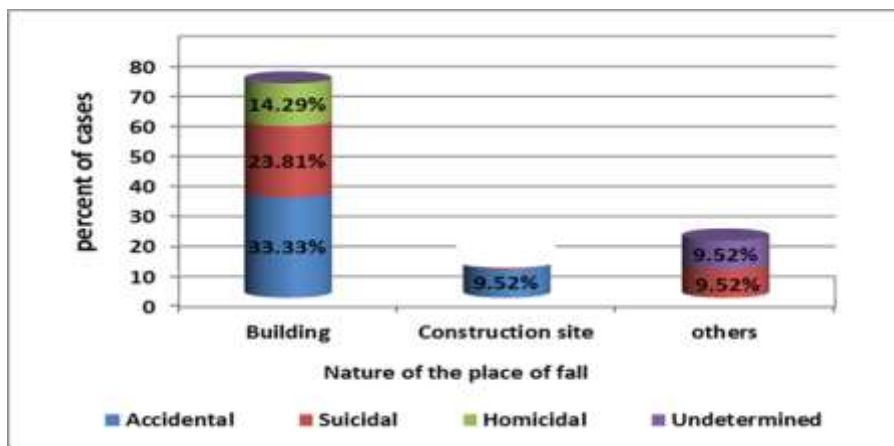


Figure (2): Bar chart shows the distribution of the studied cases of falling from height according to the manner of death and nature of the place from which falling occurs (n = 21).

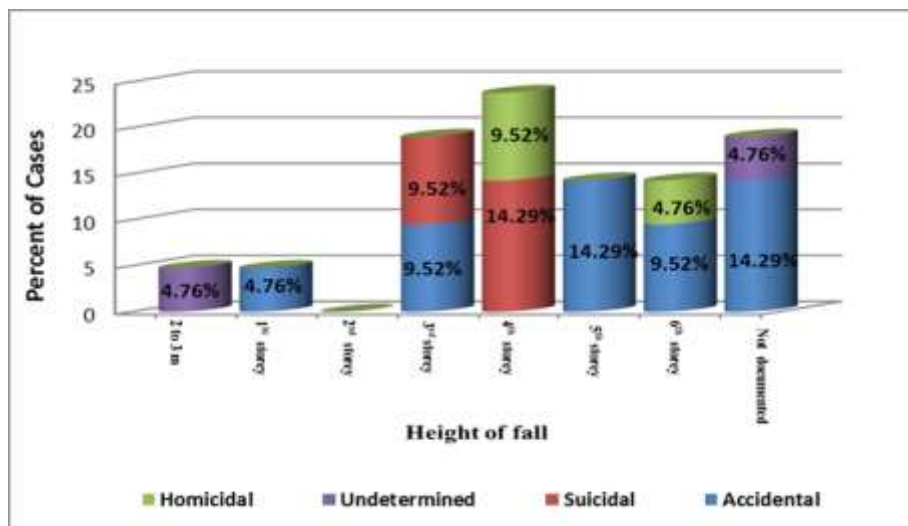


Figure (3): Bar chart shows the distribution of documented manner of death and the height of the place from which fall occurs among the studied cases of falling from height (n=21).

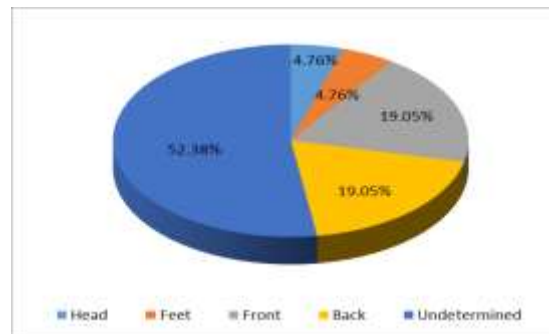


Figure (4): Pie chart shows the distribution of the studied cases of falling from height according to the primary impact site detected during autopsy (n=21).

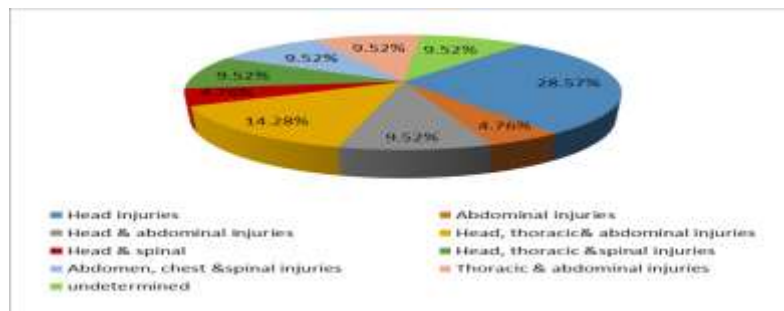


Figure (5): Pie chart shows the distribution of the studied cases of falling from height according to the cause of death (n= 21).

Discussion

Fatal falls from height become more common due to multi-storey buildings in urban population. In absence of witnesses or an unambiguous suicide note, it is very difficult to determine the manner. To distinguish between a suicide, an accident and third party fault is a very challenging task that comprises various aspects (Kumar and Srivastava, 2013)

Scene examination, autopsy findings with the assessment of suffered injuries, toxicological analysis and assignment of all available traces enhance the understanding of the manner (Türk and Tsokos, 2004).

The results of the present study have shown that in Kafr El Sheikh Governorate over a period of 14 years there were only 21 cases of fatal fall from height. The low number of cases reported in the present study could be attributed to that most of the buildings in this governorate consisted of one or two storeys, and the religion and nature of Egyptians especially in rural area. In comparison to the study done by Lau et al., (1998) who recorded 603 cases of fatal fall from height over a period of 2 years in Singapore.

The results of the present study show that most of the victims of fall from height were males in the age group between (> 30 up to 40 years). This result was in agreement with Murthy et al., (2012) who reported that no age is exempted with preponderance of male gender. These findings could be explained by the fact that males in the middle age are more exposed to accidental falls from height as they are mostly labourers working in construction, maintenance and a variety of jobs that

could be at risk of falling from height especially without proper training or equipment. As regards data about employment state, it was documented in only (38.1%) of cases. WHO (2012) reported that unemployment may expose the victim to psychiatric illness including depression and substance abuse with increase tendency to suicidal, accidental or even homicidal fall from height. Analysis of medical history of cases of fall from height is of great importance in manner determination as in cases of neurological, cardiac or other disabling conditions. On the other hand, WHO team added that side effects of medication, physical inactivity and loss of balance; particularly among older people, poor mobility, cognition, and vision, particularly among those living in an institution (nursing home) constitute risk factors for these cases. In the meantime a variety of jobs without proper safety equipments carries a great risk for accidental fall from height. Analysis of the circumstantial events of fall from height regarding social problems and psychiatric diseases were recorded as follows: 9.52% and 14.29% of the cases, respectively. Içer et al. (2013) reported that jumping was found as the most frequent suicidal method among psychiatric patients. The rate of jumping in people with schizophrenia was detected to be about (40%). Rocos and Chesser (2016) recorded that identification of the characteristics of a patient who jumps from height for suicidal purposes and the impact of social problems were of great influence, as it was present in about 34% of cases. The presence of prior suicidal attempts was

mentioned in 9.52% of cases of the present study. Rocos and Chesser (2016) emphasized that prior suicide attempts with the use of other means is of value to be correlated with suicidal falls from height.

Regarding the preliminary manner of death, this study showed that accidental falls were the most prevalent, suicidal falls were the second prevalent manner, followed by homicides. The results were in consistence with Kumar and Srivastava, (2013). While these results were not in agreement with Törő et al. (2006) and Atanasijevic et al. (2009), who found that suicidal falls were the most prevalent followed by accidental and homicidal falls. Törő et al. (2006) also reported that jumping from height is a preferred method of suicide among adolescents and young adults and it is increasing from the middle 1990s. This discrepancy in results could be attributed to the religion and nature of Egyptians which prohibit suicide.

As regards the nature of place of fall, buildings followed by construction sites were found to be the place of fall in the majority of cases. Murthy et al. (2012) emphasized that many workers could be at risk of falling from height at construction sites due to lack of proper training, planning or equipment.

As regards the height of fall the present study found that the greatest number of cases fell from the 4th storey. Törő et al. (2006) reported that suicides usually occurs at high building, hill and bridge while accidental falling occurs in connection with work or sport activities. In a study carried on by the team of Safe work Australia (2013) they found that the heights of fall ranged from one meter to 54 meters, 31% of the falls were from a height of two meters or less. The height of fall is a major determining factor of injury because at the moment of impact, a falling body undergoes deceleration and the amount of kinetic energy transferred to the ground reacts with an equal amount of energy against the body. Injuries result from the absorption of the lost energy Arbes and Berzlanovich (2014).

Examination of the path of fall or route taken by the fallen body was documented only in 4.76% of cases and it was free from obstacles. Examination of the route taken by the fallen body is of dual values. First, collision with intermediate objects or barriers, such as protruding masonry, that can retard the fall and thereby reduce the final velocity at impact. This effect results in minimizing the injuries resultant from crushing the ground. Second, contact with these structures could also produce serious injuries not related to the blunt traumas of terminal impact (Ilhan and Balcik, 2015).

The measurement of the horizontal distance between the final position of body on the ground and the wall of the building was missed in all the records of the studied cases. Studies have shown that measurement of this distance can help to establish how the fall originated. The experiments carried out by Yanagida et al. (2011) to determine falling patterns by estimation of horizontal distance concluded that, active forms of falling (jumping, running and jumping, pushed or

thrown off) result in greater horizontal distances (16 m). This distance increases in the presence of a pre-fall running area. On the other hand, the maximum horizontal distance estimated for a passive fall (loss of balance) was 10 m.

As regards the nature of impact surface, it was documented in only 38.1% of cases where the impact surfaces were hard. Body orientation in relation to impact surface was recorded in 38.1% of cases, 23.81% of them were lying on their back and 14.29% were lying on their front. İçer et al. (2013) recorded that the nature of impact surface influences to a great extent the severity of injuries. He concluded that on falling on a relatively yielding surface, the energy is given up slowly, but falling on a relatively unyielding surface (hard soil or concrete), results in a shorter time of deceleration and hence the forces on the body are much greater. On the other hand, the study of Murthy et al. (2012) on a number of cases of falling from height reported that without exception, the body always landed horizontally either on front or back.

The documented description of the site of fall from inside was only present in eleven cases (52.38%). These data included the presence or absence of suicidal note, signs of struggle, available pre fall running area and barrier and its height if present. Analysing of the aforementioned data is of great value in determining the manner. Cross (2006) said that in absence of witness or a suicide note, it is difficult to determine the manner of fatal fall from height. Signs of struggle to some extent are a good indicative of homicide (Saukko and knight 2004). Presence of pre-fall running area usually is helpful in diagnosis of suicide. This allows what we call running jump. According to Kumar and Srivastava (2013) running jump with an initial velocity exceeding 2.70 m/s implies suicide and should not be mistaken for accidental or homicidal manner of death. In the present study the presence or absence of barrier and its height were recorded in 33.33% and 19.05% respectively. They reported that inappropriate barrier is the most common reason behind accidental fall and its presence should be documented and carefully measured. Yanagida et al. (2011) emphasized that, if this barrier (windows, railings, fences etc...) is higher than the person's centre of gravity, an accidental manner of death will be unlikely. In some cases, a chair or a ladder may be employed to get over a barrier in suicidal falls.

As regards the documentation of whole body radiography, it was missed in all the records. Radiology plays a cardinal role in investigation of cases of fall from height, as it helps in evaluation of the pattern of injuries. X-ray is the most common, it allows non-invasive evaluation of important findings before the autopsy and thus selection of the optimal strategy for dissection. It serves to display and localize different types of traumatic fractures. X-ray imaging still of great help for identification of unknown deceased. Application of computed tomography and magnetic resonance imaging, improve the detailed visualization

of bony structures as well as soft tissues and internal organs (Kučerová et al., 2014).

As regards the external body examination during autopsy, the exact length of the victims in centimeters, center point of gravity and body mass were not documented in all the studied cases. These measurements are important in excluding accidental fall. Türk (2008) reported that determination of the center of gravity is a cardinal point to determine the manner of death in fatal falls, as an accident is unlikely if barrier is higher than the person's center of gravity.

Regarding the internal autopsy findings, there was extensive damage to different body regions. The head and thorax were the most affected regions followed by the abdomen and pelvis then the extremities. The neck was the least affected. Traumatic shock with multiple organ damages, (scalp injuries, skull fracture with meningeal haemorrhages and brain injuries, thoracic cage and intrathoracic injuries, abdominal wall and pelvic viscera injuries as well as pelvic girdle bone fracture and fracture of extremities) were found. The pattern of injuries encountered in current study was consistence with most of literatures Xia et al. (2012), Prathapan and Umadethan (2015) and Rocos et al (2015) described similar injuries. Bruno et al. (2014) reported that as strong common denominator for the injury pattern across all the available literature are the high prevalence of thoracic, head and abdominal injuries and the very low prevalence of neck injuries.

Determination of the previous patterns of injuries was of great help to find out the site of primary impact in (47.62%) of cases. Unfortunately, despite the great help of the primary site of impact in manner determination, it was undetermined in about (52.38%) of the studied records. Murthy et al. (2012) concluded that the study of pattern of injuries may indicate the primary site of impact and height from which the fall has occurred. The determination of actual or probable anatomical site of primary impact may be useful in reconstruction of the events and assessing the manner of death. Determination of the anatomical site which first impacts the ground (the primary site of impact) is useful in reconstruction of the event (Kumar and Srivatava, 2013).

The present study showed that the cause of death of the majority of victims was head injuries either by itself or in conjunction with abdominal injuries and/or spinal and thoracic injuries followed by combined abdominal, thoracic and spinal injuries as well as abdominal and thoracic injuries. The cause of death was undetermined in 9.52% of cases. These findings are in agreement with Kumar and Srivastava (2013) who said that, in fall from height, head was commonly the site of primary impact and craniocerebral damages were the cause of death. Internal organs like liver, spleen and lung were injured mainly in cases of primary side impact due to deceleration. Dickinson et al (2012) found that head injuries significantly increase the likelihood of death.

In the present study toxicological screening of the commonly used drugs (hypnotics, sedatives, antidepressants, tranquilizers, antiepileptics and tramadol) was carried out to most of cases (90.48%) and proved to be positive in only one case. Blood alcohol content was performed in (61.9%) of cases and it was negative in all of them. Toxicological analysis is very important issue that may help in solving the problem of the manner of fatal fall from height. Toxicological analysis revealing an evidence that a psychotropic drug had been taken could constitute an indirect argument for suicide in the absence of any known psychiatric history (Türk, 2008). Psychiatric illness may lead to addicting some drugs or substances of abuse which found to be implicated in intentional and accidental as well as homicidal fall from height (Pavia et al., 2005). Systematic qualitative and quantitative toxicological analysis made a significant contribution to the diagnosis of suicide by revealing either an unknown psychiatric treatment or a toxic level (Fanton et al., 2007). Murthy et al., (2012) emphasized that alcohol intake is a contributing factor in accidental falls.

Conclusions

There was evident deficiency in the protocol of documentation of the findings of cases of fatal fall from height presented to Kafr EL Sheikh Medico legal Department. This deficiency was clear in missing data documentation in some records only (e.g. description of the path of fall, nature of impact surface, description of the site of fall from inside etc). Other data were not documented at all in the records (e.g. horizontal distance, body radiography and external body examination). These defects encountered hinder manner determination.

Recommendations

- Examination of cases of fatal fall from height should be done through integration between a team consisting of police agents, criminalists, biomechanical experts and forensic pathologists.
- Detailed documentation of the data of the scene investigation, detailed autopsy, results of laboratory tests and previous data about medical history, social problems, psychiatric illness, previous suicidal attempts and family history should be documented regardless being positively or negatively found.
- Forensic pathologist should have an idea about forensic mechanics taking into consideration the exact length of the victim, center point of gravity and body mass that help in determination of the trajectory of fall.
- Broadening the spectrum of drug screening during toxicological analysis to include not only drug of abuse but also some therapeutic drugs.
- In unresolved cases, where the manner cannot be determined, scientific intervention with use of modern computerized methods is mandatory.

- A unified protocol designed by Egyptian forensic experts to be applied in the Department of Forensic Medicine all over the republic.
- The following modified protocol is proposed for documentation in cases of fatal fall from height to avoid the deficient aspects encountered in dealing with such cases and highlighted by the present study.

Updated protocol for documentation and evaluation in cases of falls from height

According to the protocol described by *Holder et al., (2011)* this modified protocol was proposed to emphasize the main points that should be fulfilled during documentation and evaluation of cases of falls from a height.

This protocol consists of four items:

Item (I): investigative tools and equipments.

Item (II): arriving at the scene

Item (III): documentation and evaluation of the scene

Item (IV): establishing and recording decedent profile information.

Item (V): post mortem examination

Item (I) and (II) will be carried out according to the general guide of scene investigation (*Holder et al., 2011*).

Item (III): Documenting and evaluating the scene:

➤ **Photograph the scene:**

Prior to moving the body or evidence, the investigator has to:

- Remove all non-essential personnel from the scene and obtain an overall (wide-angle) view of the scene to locate the specific scene to the surrounding area.
- Photograph specific areas of the scene (the building from outside, the trajectory of fall and the site of fall) to provide more detailed views of specific areas within the larger scene.
- Photograph the scene from different angles to provide various perspectives that may uncover additional evidence.
- Obtain photographs even if the body or other evidence has been moved.
- Photograph the decedent's face. Take additional photographs after removal of objects/items that interfere with photographic documentation of the deceased.
- Photograph the surface of impact (after the body has been removed).

Note: *Never clean face, do not change condition. Take multiple shots if possible. If evidence has been moved prior to photography, it should be noted in the report, but the body or other evidence should not be reintroduced into the scene in order to take photographs.*

➤ **Develop descriptive documentation of the place where the decedent was found:**

After photographic documentation of the scene and prior to removal of the body or other evidence, the investigator has to:

- Document the scene location (address, and building name) and time of arrival of the death investigator at the scene.
- Diagram/describe in writing items decedent relationship to the scene, the body position.
- Describe and document, site of fall from outside e.g. the height of the place from where the decedent fell, the horizontal distance between the site of fall and the building, the presence or absence of obstacles and the route taken by body to reach the ground in the trajectory of fall.
- Note any evidence that has been moved prior to written documentation.

➤ **Record findings of external body examination at the scene of fall:**

This documentation provides detailed information regarding the decedents built; it provides also the presence or absence of clothing, and the presence of treatment or resuscitative efforts.

- Identifying and record body temperature and other post mortem changes.
 - Documenting blood/body fluid on the body (froth/purge, substances from orifices), location, and pattern before transporting.
 - Checking body, clothing, and scene for consistency / inconsistency of trace evidence and indicate location where artifacts are found.
 - Description body orientation in relation to the impact surface.
 - Reporting the method of the cadaver removal and transportation from the scene.
- #### ➤ **Document information about of the site from which fall occurs:**
- Description of the scene environments including odors, lights, temperatures, and other fragile evidence.
 - Description of the signs of struggle and closed doors or windows.
 - Description of blood and body fluid evidence including volume, patterns, spatters, and other characteristics.
 - Description of the presence/absence of suicidal note, medication, illicit drugs empty bottles and syringes.
 - Description of available distance for running before fall.
 - Description of the presence /absence of barrier (e.g. fence), its height and helping agents like chair or ladder beside the window.

Item (IV): Establishing and recording decedent profile information:

➤ **Document the discovery history:**

The investigator has to produce clear, concise, documented information concerning who discovered the body, the circumstances of discovery (the place, time etc...)

➤ **Document decedent medical history**

Interview family members and associates as needed. In addition to, documenting the decedent's medical signs or symptoms prior to death. The forensic examiner has to document:

- Medications taken, alcohol, drugs of abuse, family and medical history.
- Treating physicians and/or hospitals to confirm history and treatment.

➤ **Document decedent mental health history in regard to:**

- Hospitalizations and medications.
- History of suicidal ideations and/or attempts.
- The treating psychiatrist, psychologists, counselors etc.....
- Family mental health history.

➤ **Document principles of social history :**

Relevant social history should include:

- Marital/domestic history and family history (similar deaths, significant dates).
- Employment history, financial status and sexual history
- Daily routines, habits, activities, relationships, friends, and associates.
- Religious, ethnic, or other pertinent information (e.g., religious objection to autopsy).
- The educational background and criminal history.

Item (V): Reporting findings of post mortem examination:

➤ **External autopsy findings:**

- Documenting whether body was clothed or naked.
- Measuring core body temperature, post mortem changes and post mortem interval.
- The length of the deceased in centimeters and locating the central point of gravity.
- Description of the body built.
- Photographing any injury from different angles and obtains some photographs with scales to document specific lesions.
- Photographing and detailed description of any injuries pointing to foul play.
- Reporting radiological findings, to detect any fracture, its type and its extent. Records any type of internal finding either traumatic or pathological.

➤ **Recording internal autopsy findings:**

- Recording any traumatic lesion; determine its distribution and severity.
- Documenting deceleration injuries (e.g. trauma of aortic isthmus, rupture or laceration of the pulmonary trunk etc.)
- The pattern of different injuries for determination of the site of primary impact.

- Any pathological area in the organs or tissues is noted and may be photographed.
- Results of forensic pathological examination.
- Biochemical, microbiological and toxicological screening results.

Conclusion

Conclusion is to be documented to summarize positive autopsy findings and must contain the following information:

- Identity of the autopsied body.
- Diagnosis of traumatic or pathological lesions.
- Deduction of the probable primary site of impact.
- Determination of the cause of death.
- Determination of the manner of falling from height; if possible.

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الملخص العربي

التي عرضت على مصلحة الطب و القصور المواجه أثناء توثيق حالات السقوط المميت من علو الشرعى- كفر الشيخ في الفترة من (١٩٩٩ إلى ٢٠١٣)

ماجدة مختار رمضان، أمانى السيد عبد الرحمن و نسرين عبد الرحمن محمود ١ و أحمد محسن علام ٢

السقوط من علو يمثل شكلا مهما من أشكال الإصابات الرضية فى المجتمع ، يزداد معدل حدوث حالات الوفيات بسبب السقوط من ارتفاع يوما بعد يوم. لذا فإن تشخيص نمط السقوط من علو يعد مسألة في غاية الأهمية فى علم الطب الشرعى. فعند تحديد نمط السقوط المميت من الضروري أن ينظر الطبيب الشرعى إلى نتائج الصفة التشريحية من خلال الاطار الخاص بالعوامل المرتبطة بالأشخاص ونتائج التحليل السوموم والظروف المحيطة بمكان الحادث. تهدف هذه الدراسة أولا: إلى إلقاء الضوء على بعض القصور المواجه فى أثناء دراسة التقارير الطبية الشرعية لحالات السقوط من علو. ثانيا: اقتراح بروتوكول لتوثيق بيانات حالات الوفيات الناجمة عن السقوط من علو . هذه الدراسة استرجاعية قائمة على دراسة ملفات حالات السقوط المميت فى محافظة كفر الشيخ فى الفترة من ١ يناير ١٩٩٩ حتى ٣١ ديسمبر ٢٠١٣. وقد تم فحص الملفات للحصول على البيانات التالية: البيانات الشخصية، والتاريخ المفصل للحالة، فحص مكان الحادث، نتائج تشريح الجثة ونتائج تحليل السوموم. وأوضحت نتائج هذه الدراسة أن العدد الكلى للحالات خلال تلك الفترة كان ٢١ حالة وأن عمر الضحايا كان يتراوح من ٨ أعوام الى ٦٩ عاما، وكان غالبية هذه الحالات من الذكور (٦١,٩%). وكانت المعلومات الخاصة بطبيعة عمل الضحايا موقفة فى (٣٨,١ %) من الحالات، أما فيما يخص المعلومات الطرفية فكانت غير موقفة بمعظم الملفات. كان السقوط العرضى أكثر أنماط السقوط من علو انتشارا بين الحالات (٥٢,٣٨%). وكان نمط السقوط الانتحارى هو النمط التالى فى الانتشار. أظهر فحص مكان السقوط من الخارج أنه كان فى أغلب الحالات مبانى (٧١,٤٤%) كما أن ارتفاع موضع السقوط كان فى أغلب الحالات الدور الرابع (٢٣,٨١%). لم يذكر مسار السقوط فى أغلب الملفات (٩٥,٢٣%). وُثقت طبيعة سطح الارتطام فى (٣٨,١%) من الحالات وكان السطح صلب. وضع الجسم بالنسبة لسطح الارتطام تم ذكره فى (٣٨,١%) من الحالات. توثيق وصف مكان السقوط من الداخل كان فيه قصور شديد. أما عن وجود عائق للسقوط وارتفاعه فتم ذكره فى (٣٣,٣٣%) من الحالات فقط. لم يتم عمل أشعات من أى نوع لأى من الحالات كما لم يتم عمل القياسات الخارجية للجسم لأى حالة . أوضحت نتائج التشريح وجود إصابات شديدة بمناطق الجسم المختلفة وكانت منطقتي الرأس والصدر هما أكثر المناطق تضررا . كما تبين أن أول جزء من الجسم قد تعرض لصدمة الارتطام قد تم ذكره فى (٤٧,٦٢%) من الحالات. سبب الوفاة كان نتيجة إصابات الرأس فى أغلب الحالات اما بمفردها او بالاشتراك مع إصابات أخرى. البحث عن الأدوية شائعة الإستخدام من خلال تحليل السوموم قد تم بنسبة (٩٠,٤٨%) من الحالات . حيث كانت النتيجة سلبية بنسبة (٩٤,٧٤%) . وقد أجرى تحليل البحث عن الكحول فى (٦١,٩%) من الحالات وكانت النتيجة سلبية فى كل الحالات. وقد خلصت الدراسة الى أن المعلومات عن تاريخ الحالة، فحص موقع الحادث سواء من الداخل أو الخارج، وكذا توثيق الصفة التشريحية و تحليل السوموم المختلفة كان فيه قصور شديد فى الملفات. كثيرا من التوصيات تم اقتراحها مع اقتراح بروتوكول لتوثيق حالات السقوط المميت من علو.

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