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CASE REPORT

A Death of a Man Due to Strong Acid Trauma at a Rice Field, a Homicide or Suicide ?

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ABSTRAK

Trauma zat kimia korosif asam dan basa konsentrasi kuat dapat terjadi karena kesengajaan maupun ketidaksengajaan, misalnya kelalaian kerja, kecelakaan, serta anak-anak yang menelan zat-zat korosif secara tidak sengaja. Pencetus kasus tersebut antara lain: perselingkuhan dan penolakan lamaran (44,3%), perselisihan (30,37%), kecelakaan industri (8,22%), ketidak sengajaan (4,48%), dan penyebab lain (12,03%).

Asam bersifat korosif pada konsentrasi yang tinggi, bersifat iritan pada konsentrasi yang sedang dan bersifat perangsang pada konsentrasi rendah. Luka akibat zat asam kuat menyebabkan "nekrosis koagulasi" pada jaringan yang terkena, koagulum ini kemudian akan membatasi penetrasi lebih dalam ke jaringan.

Kasus di Demak yang terjadi pada bulan September 2015, korban seorang laki-laki, usia 60 tahun, pekerjaan petani, meninggal dunia ditemukan di tengah persawahan, merupakan salah satu penentang proyek pengerukan sungai illegal. Di samping jenazah ditemukan cangkul dan botol terbuat dari bahan "plastik" wadah pupuk tanaman (tergolong asam sedang), kesannya korban meninggal karena bunuh diri dengan mengkonsumsi cairan pupuk.

Pada pemeriksaan luar didapatkan: Tanda terbakar yang berwarna coklat kemerahan atau hitam, kering dan keras pada kelopak mata, lubang hidung, bibir, lidah, leher dan dada. Pada pemeriksaan dalam didapatkan: 1. Mukosa teriritasi, dengan gambaran merah terang dan merah kecoklatan, didapatkan ulserasi. Tanda iritasi pada lidah, laring, edema pada glottis, esofagus. 2. Peradangan dengan gambaran pseudomembran pada trakea dan bronkus yang mengakibatkan kerusakan epitel superfisial dan nekrosis yang dapat terjadi sampai kelapisan submukosa. 3. Edema otak karena anoksia. Pemeriksaan forensik menyatakan penyebab kematian adalah pembunuhan.

Kata kunci : Pembunuhan-bunuh diri, asam kuat, pemeriksaan forensik, sebab kematian.

ABSTRACT

In general highly corrosive acids or bases injury can occur due to deliberate or unintentional, such as workplace-related accidence, vocational negligence, unintentional child corrosive poisonings. Acids are considered to be corrosive when it has a high concentration, are irritants at moderate concentrations, and stimulant at low concentrations. This is a report of a strong acid poisioning case of a 60 year-old- man found dead in the middle of a rice field in Demak in September 2015. The victim was one of the farmers protesting the illegal dredging project. At the crime scene, a hoe and a bottle made of "plastic" (used fertilizer container, classified as moderate acid) lying beside the deceased, giving an impression that he commited suicide by consuming the liquid. External examination revealed: burn marks are red brown or black, dry and hard on the eyelids, nostrils, lips, tongue, neck and chest. The results of the examination showed: 1. Mucosal irritation, with a bright red and brownish red, accompanied by ulceration. It was also found irritation in tongue, larynx and edemous glottis and esophagus. 2. Pseudomembranous inflammation of the trachea and bronchi which resulted in superficial epithelial damage and necrosis affect submucosal layer. 3. Brain edema due to anoxia. The forensic examination confirms that the cause of death was homicide.

Keywords: *Homicide or suicide, strong acids, forensic examination, the cause of death.*

INTRODUCTION

In general, highly corrosive acids or bases injury can occur due to deliberate or unintentional, such as workplace-related accidents, vocational negligence, accidence, unintentional child corrosive poisonings. Despite few number of homicides or suicide attempts with corrosive chemicals, there was statistically a significant increase in the incidence every year. The case of injury due to corrosive chemicals (acids and bases) in Indonesia resulting in death is less exposed in the mass media making it difficult to determine its incidence since most of these cases have been handled by the surgeon. The trigger of the cases in India included among others: infidelity and rejection of marital proposal (44.3%), disputes (30.37%), industrial accidence (8.22%), accidence (4.48%), and other causes (12.03%) (Neeta Lal, 2015).

Corrosive chemicals can locally or systemically

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irritate the body. The effects of corrosive chemical substances irritating body tissues cause local inflammations and tissue damages. The effects of corrosive chemicals in the body's circulation causing systemic reactions including paralysis of the respiratory tract, liver detoxification function impairment, acute renal failure, and an inflammatory reaction in the gastrointestinal tract. Corrosive substances can enter the body via several routes, including oral (ingestion), inhalation, and parenteral and percutanous (Dahlan S, 2002).

In various cases of corrosive chemicals injury,signs of different forensic examination are found. It heavily depends on the type of corrosive chemical substances including acidic or alkaline with a mild, moderate or strong concentration. Injury of strong acids can cause burns that can be distinguished from other causes, such as due to fire, hot solid objects, water or gas including degree of burns.if the cause of the fire and solid objects can cause up to fourth degree of burn (charcoal), while other causes can only cause up to three degree burn. To distinguish acidity, a litmus test on the wound can be conducted. (Dahlan S, 2002).

CASE PRESENTATION

In September 2015, a 60- year-old -man, a farmer , r, was found dead in the middle of rice fields belonging to Public Works Department (a land on the river banks of irrigation that has long been cultivated by the victim). He was one of the working farmer protesting the illegal dredging project). Beside the deceased, a hoe and a bottle made of "plastic" (usedfertilizer container classified as moderate acid) lying beside the deceased, giving an impression that the victimcommited suicide by consuming the liquid. After a forensic examination it was confirmed that his death was no due to committing suiside or an accidence, but a murder. The conclusion was based on the external examination showing a signs of strong acid poisoning in which a strong acid requres a container made of glass not plastic considering that the plastic material will be easily burnt by a strong acid. Referring to the initial phenomenon, Demak Police conducted investigations and inquiries to reveal whether the victim's death was due to an accidence, homicide or suicide and confirm his cause of death.

DISCUSSION

Definition

Trauma is injury causing a physical effect in the form of a wound or tissue discontinuity. Corrosive chemicals are substances such as strong acid or bases causing body injuries leading to protoplasm coagulation, deposition and breakdown of proteins and water absorption. Injuries due to corrosive substances can be defined as local or general acute/chronic toxicity or degenerative skin changes, nonallergic. Strong corrosive chemicals including strong acids, can cause burns, and strong bases can cause wound with edema, yet soft due to its reaction with protoplasm and saponification (Dahlan S, 2002).

Pathophysiology

Acids are considered to be corrosive when they have at a high concentration, are irritants at moderate concentrations, and is stimulant at low concentrations. Strong acid causing injury by extracting water from the tissues, coagulating proteins becoming albuminat resulting in black or brown discoloration, and converting the hemoglobin into the acid hematin. Some of chemical acids causing injury are as follows (Amit Sharma, 2011):

a. Hydrochloric acid

Hydrochloric acid (HCl) is a strong and colorless substance. Its source of poisoning is usually from industry, laboratory, the use of HCl as a cleaner in a domestic environment. Strong hydrochloric acid can be used in abortions by injecting it per vagina into the uterus, causing fetal death (demise). A high concentration of HCl is commonly used in suicide cases. It is rarely associated with an accidence and homicide.

b. Sulfuric acid

Sulfuric acid often used in the manufacturing process and are reagents that are important in the laboratories. Its sources of poisoning are usually in industries and laboratories. Sulfuric acid has physical properties of a colorless, odorless, and non-flammable. If it added with water they produce heat, and contact to the skin will cause changes of color into black burning like discoloration.

c. Nitric acid

Nitric acid is widely used in the manufacturing process and important reagent in the laboratory. Its poisoning souces include industries, sources, explosives factory, and laboratory.

Nitric acid has physical properties of a clear colorless liquid. Yellowish red nitric acid is a commercially nitric acid containing nitrogen oxide. In high concentrations, these acids can destroy organic matter by means of oxidation and reaction xanthoproteic. Nitric acid will cause mucosal damage and scars in the

form of a brownish yellow mold in mucosa.

d. Acetic acid

Acetic acid source poisoning is from industry, laboratory, usually used as the main ingredient of vinegar. A solution of 99% glacial acetic acid used in chemical laboratories, and is a strong acid and pungent and distinctive. Acetic acid poisoning is often caused by inhalation. The physical properties of acetic acid is colorless, the acetic acid in liquid form yellowish, pungent and distinctive.

e. Oxalic acid

The nature of oxalic acid is not so corrosive but still toxic and causing death within a few minutes to 1 hour. Acid is corrosive of local and systemic effect that can be fatal even despite non-lethal local damage. At autopsy, if indigested, white crystal or a strong acid will case whitening effect of mucosa of the mouth, pharynx and esophagus although local bleeding may also occur. In stomach, mucosal damage (erosion) occurs and cause dark brown or black color derived from the acid hematin. Death to the victims is related to the acute phase due to abnormalities of muscle function (including abnormal myocardium) due to hypokalemia due to precipitation of calcium the body. Death occurs after 2-10 days.

Clinical Manifestations

Symptoms of strong acid poisoning among others are as follow (Amit Sharma, 2011) :

1. Oral, esophagus, the stomach burn
2. Vomiting of mucus tinged with blood, mucous, and parts of the mucous membranes.
3. Pain and bloating.
4. Mouth corners corrosion
5. Chalky white teeth
6. Tongue corrosion
7. Hoarseness due to laryngeal edema
8. Intestinal motility disorders, diarrhea, or constipation.
9. Dilated pupils
10. Dysphagia.
11. Oliguria and dysuria

Various characteristics of corrosive materials as proposed by Snepherd, 2003, are as follows:

1. Toxic spill on the victim's body can damage the structure of the skin; this may help the reconstruction process to estimate when the poison is consumed. The lips can burn and poison drop can be on the chin, neck and chest. Burning mouth patterns can be used to see the type of poison. If victims taking the poison in a sitting or standing position, the poison will flow to the chest and abdomen. When lying down, the poison will flow through the face and cheeks and then to the back of the neck. Spill toxins can enter the nose.
2. The inferior part of the mouth can be eroded, swollen or shrinking tongue depending on the material of poison. The pharynx, larynx and esophagus is eroded and in a few minutes glottis will develop edema. Airway mucosa can be damaged leading to aspiration of fluid into the lungs causing pulmonary edema and bleeding.
3. The lower part of the esophagus and stomach will undergo discoloration, desquamation and perforation. After few minutes, toxins can flow deeper and may lead to damage the small intestine but is rarely happen because of the time factor and the pyloric spasm.
4. Toxins spill into the lungs can cause pulmonary edema and bonchopneumonia leading to death.

The cause of death due to corrosive chemical intoxication according to Amit Sharma, 2011 can be classified into two: the immediate and slow as follows:

Immediate:

1. Respiratory failure and edema due to spasm of the glottis.
2. Perforation of the stomach causing peritonitis.

Slow:

1. Limp and malnutrition, starvation as a result of the esophagus or pylorus undergoing cicatrix and stenosis formation
2. Refractory Dyspepsia

It is important to note that the appearance of post-mortem does not necessarily give a picture of the time of death, since the acid will continue to damage the tissue leading to perforation which is often obtained on a sighting post mortal. Ingestion of corrosive substances often produces adverse effects on the esophagus and or stomach. Esophagus mucosa resistant to acidic substances, and then it will cause severe inflammation of the abdominal lining. Substance corrosive acid can rapidly damage the esophagus and the stomach and intestines. Necrosis of the entire colon is rarely found as a result of ingestion of corrosive substances (Snepherd, 2003). Several factors influencing the post mortem injuries are:

Acid concentration, number of acid used, and the duration of patients survival after taking the strong acid. If death occurs in a short time, a variety of signs that can be found are as follows: (Amit Sharma, 2011):

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Figure 1. Injury due to acid on the skin

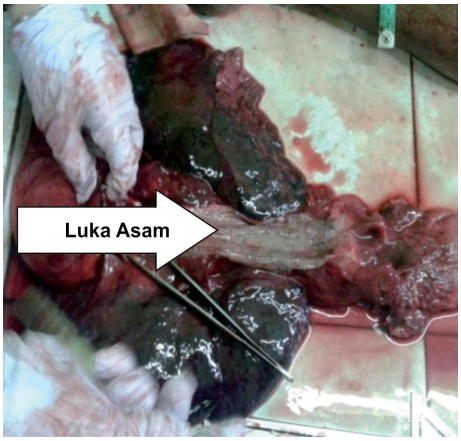

Figure 2. Injury due to acid in the glottis, esophagus and tongue

Figure 3. The effects of acid violence in the brain (Edema)

1. Corrosion and damage to the mouth, throat, esophagus and stomach, in the form of little erosion to the extensive damage spots.
2. Perforation of the stomach resulting in the release of stomach contents into the cavity of the perineum. Damage to the perineum or organ in the abdominal organs can also occur.

FORENSIC EXAMINATION

External and internal forensic examinations, or supporting examination found the following signs:

a. The external examination showed:
   Reddish brown or black burn marks, dry and hard on the eyelids, nostrils, lips, tongue, neck and chest (Figure 1).
b. The internal examination showed:
   1. The irritated mucosa, red-brown, also ulceration.
   2. Signsof irritation of the tongue, larynx, edema of the glottis and esophagus.
   3. Inflammation pseudomembranous of the trachea and bronchi resulted in superficial epithelial damage and necrosis affecting mucosa (Figure 2).
   4. Brain edema (Figure 3)
c. evaluation with litmus paper and anatomic pathology showed the following results (Chadha, 1997):
   1. Examination using litmus paper showing a change in red.
   2. Evaluation of tissue injuries due to strong acids, thickening of the epidermis lining and the granules on a wave-shaped vesicles collagen and hyperemia.

CONCLUSION

In accordance with the findings obtained at the crime scene, namely rice fields, and the discovery of the used fertilizer bottle made of plastic, it is not likely that the bottle was used for packing strong acids, because strong acids can only be placed in container made of glass. The notion that victim was deliberately brought strong acids also could not proven meaning someone else must have prepared it, because besides the deceased, a container of strong acid did not exist.

Based on the examination of the dead body, it can be concluded that it has been identified that it was of a man of over sixty years old, brown complection working as a farmer. An external examination results showed reddish brown or black burn, dry and hard on the eyelids, nostrils, lips, tongue, neck and chest. The examination showed:

1. The irritated mucous, giving a brownish red image, ulceration was found.
2. Signs of tongue irritation of the larynx, edema of the glottis and esophagus.
3. Inflammation pseudomembranous of the trachea

and bronchi resulted in superficial epithelial damage and necrosis can affect the submucosal layers.

4. Brain edema
   Referring to the facts, it can be concluded that the the victim dead because of the murder not a suicide or an accident.

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