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COMPARISON OF IN VIVO CYANIDE EXAMINATION WITH PICRIC ACID AND PRUSIAN BLUE METHODS

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ABSTRACT
This study aims to determine the comparison of invivo cyanide examination by comparing the Pyric Acid method with the Blue Prusian method in the stomachs of experimental animals. It is an imental expre research. Samples of 40 white Wistar rats weighed between 100-200 g. Then the 40 rats were given lethal dose cyanide orally and divided into 2 groups: 1 group will be detected cyanide by picric acid method and 1 other group using blue prusian method. In such groups are taken gastric tissue. Consecutive examination time intervals on days 1 and 7. The results of cyanide examination with the Picric Acid method were obtained on day 1 of positive gastric tissue cyanide 94.7%, while with the Blue Prusian method on day 1 examination positive cyanide 85%. The results of cyanide examination with the PikraAcid t method on day 7 found that the gastric tissue was positive for cyanide 36.8%, while with the Blue Prusian method 35%. Both methods showed high sensitivity to cyanide examination in the gastric postmortem ($P<0.05$).

INTRODUCTION

Sianide is a very deadly toxic substance. Cyanide has been used since thousands of years ago (Nancy, 2022). Cyanide was also widely used during the First World War (Nancy, 2022). Cyanide in low doses can be found in nature and is present in every product we commonly eat or use (Burns, Bradbury, Cavagnaro, & Gleadow, 2012). Bacteria, fungi and algae can produce cyanide (Gupta, Balomajumder, & Agarwal, 2010). Sianida is also found in cigarettes, motor vehicle smoke, and foods such as spinach, bamboo, peanuts, tapioca flour and cassava. It can also be found in some synthetic products (Staples & Chatterjee, 2002). Cyanide is widely used in industry, especially in manufacturing gassuch as sodium, potassium or calcium cyanide (Esdaile & Chalker, 2018).

The effects of cyanide are very rapid and can result in death within a few minutes (Gracia & Shepherd, 2004). Cyanide is a major contributor to morbidity and mortality of approximately 5,000-10,000 deaths, asa result of inhaling cyanide fumes in the United States each year (Woodson et al., 2018). According to the American Association of Poison Control Center Toxic Exposure Surveillance System, 5 out of 242 cases in 2007 and 3 out of 238 in 2008 were fatal exposures (Cook & Brooke, 2021). Canada and the United States banned the use of cyanide, because it causes pollution and has not been able to overcome water leaks and sewage containing 1.2 cyanide (Schweitzer & Noblet, 2018).

Mining companies and the government in Indonesia lie to the public by promoting cyanide (Verbrugge, Lanzano, & Libassi, 2021). As a result, there have been many poisoning cases, even the last five years of data at the Forensic Medicine

Installation of RSUP Dr. Sardjito, cyanide ranks kedua as the cause of death after alcohol intoxication 3. Many cases of murder using cyanide poison were found to have rotted, such as the murder case in Langse Gunung Kidul cave, the tomb demolition case in Sleman and Purwokerto. Medical evidence in this case for legal evidence absolutely needs toxicological examination, so it is necessary to find an accurate examination method in handling cases suspected of dying from cyanide poisoning (Bertomeu-Sánchez, 2013).

Based on the above problems, the medical evidence of the use of cyanide in murder cases needs to be accurately examined with tissue samples (Puspitasari & Akmal, 2022). There are various methods for cyanide testing but most are complex and cumbersome and take a long time. There are onlytwo methods of proving cyanide that are simple and practical, namely the Pyric Acid method and the Blue Prusian method (Van der Merwe, 2012). But there has been no research related to comparing the two methods, or their application to the network. So it is necessary to conduct research per comparison of invivo cyanide examination between the Pyric Acid method and the Blue Prusian method in gastric tissue with time intervals on day 1, and day 7.

This study aims to determine the comparison of Invivo Cyanide examination between the Pyricric Acid method with Blue Prusian in gastric tissue with consecutive time intervals on day 1 and day 7.

RESEARCH METHODS

In addition to this research is experimental, the subject of the study is a white rat type Wistar diperoleh from the center of providing experimental animals Universitas Gadjah Mada. Samples of 40 white Wistar rats weighed between 100-200 g. Then the 40 rats were given lethal dose of cyanide orally and divided into 2 groups: 1 group will be treated cyanide with picric acid method and 1 other group using blue prusian method. In such groups are taken gastric tissue. Consecutive examination time intervals on days 1 and 7.

RESULTS AND DISCUSSION

Result cyanide examination with the Picric Acid method was obtained on day 1 gastric tissue positive cyanide 94.7%, while with the Blue Prusian method on day 1 examination positive cyanide 85%.

The results of cyanide examination with the Pyric Acid method on day 7 found that the gastric tissue was positive for cyanide 36.8%, while with the Blue Prusian method 35%.

Table 1. Cyanide detection by pyrric acid and blue prucian acid method on day 1 posmortem

RESULT	Picric acid method		Blue Prusian Method		Sum	
	n	%	n	%	n	%
Positive	18	94,7	17	85	35	89,7

Negative	1	5,3	3	15	4	10,3
Sum	19	100	20	100	39	100

Table 2. Cyanide detection by pyrric acid and blue prucian acid method on day 7 postmortem

RESULT	Picric acid method		Blue Prusian Method		Sum	
	n	%	n	%	n	%
Positive	7	36,8	7	35	14	35,9
Negative	12	63,2	13	65	25	64,1
Sum	19	100	20	100	39	100

Table 3. Sensitivity of the Pyric Acid method on days 1 and 7 postmortem

POSMORTEM	POSITIVE	NEGATIVE	SUM
Day 1	18	1	19
Day 7	7	12	19
SUM	25	13	38

$X^2=121, p<0.05$

Table 4. Sensitivity of Blue Prusian method on days 1 and 7 postmortem

POSMORTEM	POSITIVE	NEGATIVE	SUM
Day 1	17	3	20
Day 7	7	13	20
SUM	24	16	40

$X^2=100, p<0.05$

Statistical analysis of cyanide examination in gastric tissue using the Pyricric Acid and Blue Prusian Acid methods on day 1 and day 7 showed that both methods have the same sensitivity (P<0.05), data can be seen in table 3, table 4. This shows that both methods can be applied to cyanide examination on the tissues of victims suspected of dying from cyanide poisoning in postmortem conditions day 1 to day 7.

CONCLUSION

The results of cyanide examination with the Picric Acid method were obtained on day 1 of positive gastric tissue cyanide 94.7%, while with the Blue Prusian method on day 1 examination positive cyanide 85%.

The results of cyanide examination with the Pyric Acid method on day 7 found that the gastric tissue was positive for cyanide 36.8%, while with the Blue Prusian method 35%.

Both methods have the same sensitivity (P<0.05) and show that both methods can be applied to cyanide examination in the tissues of victims suspected of dying from cyanide poisoning in postmortem conditions day 1 to day to 7.

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