

Hyperbaric Oxygen Treatment in Acute CO Poisoning

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—國文抄錄—

一酸化炭素中毒治療에 있어 高壓酸素療法の 効果에 關한 研究

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1950年以後 無煙炭으로 만든 煉炭을 炊事, 煖房用으로 家庭에서 廣範圍하게 使用하게 되면서 煉炭가스內의 一酸化炭素로 因한 中毒事故가 頻發하여 深刻한 國民保健의 問題가 되어왔다.

著者들의 實態調査(1975年度)에 依하면 서울特別市 一圓에 있어 一酸化炭素中毒의 年間發生은 人口 10萬當 輕症 260名, 昏睡狀態의 重症中毒 45名, 死亡 1名으로 危險人口를 3,000萬名으로 하였을 때 全國의으로 一酸化炭素中毒의 推定發生數는 年間 輕症 78萬名, 重症 13萬 5千名, 死亡 3,000名으로 그 被害의 規模가 100만을 肉薄하는 可恐할 數字를 보여주고 있다.

著者들은 이러한 深刻한 國民保健의 問題를 于先 實踐可能한 第二次豫防에 力點을 두어 高壓酸素療法를 普及할 目的으로 一人用高壓酸素裝置를 開發하고 1969年 1월에 서울大學校病院에 高壓酸素治療室을 開設하여 急性一酸化炭素 中毒患者에 對한 應急治療를 實施하여 1978년까지 10年間の 治療結果를 要約한바 다음과 같다.

1. 總治療患者數는 2,242名이고 回復된 數는 2,202名으로 98.2%의 回復率을 보였다.
2. 季節的으로 10月에서 4月까지가 年中最盛期이나 5月에서 9月까지도 적지않은 患者의 發生을 볼 수 있었다.
3. 年齡別分布를 보면 15歲~29歲群이 全體患者의 半以上인 52.7%를 차지하고 있고 0~14歲群은 人口比에 對해 發生이 훨씬 적은 結果를 보이고 있다.
4. 到着時間別 入院率은 午前 10時以後 到着群서부터는 入院率이 急增하는데 이는 病院到着이 늦일수록 當日回復이 되지못하고 入院加療하게 됨을 나타내주는 結果라 할 수 있다.
5. 併發症으로는 急性褥瘡, 肺炎 및 神經學的 異常等의 所見을 많이 볼 수 있었다.

Carbon monoxide poisoning is one of the most serious public health problem in Korea. According to the results of recent surveys on the incidence of CO poisoning, the severity of health hazards by this invincible demon is threatening one. Among 30 millions of people who depend on coal briquette as a domestic fuel for heating and for cooking,

almost one million and suffering from the noxiousness of coal briquette gas, especially from CO. More than 85% of those intoxicated by CO are mild cases with symptoms such as headache, emesis and chest pain, but around 15% of the intoxicated are in semi-comatous or comatous states which strongly indicate the application of intensive

oxygen therapy.

In Korea, very unique underfloor heating system has been employed, called 'Ondol'. The coal briquette gas produced by burning anthracite coal briquette passes through the horizontal flues below the mud-plastered stone floor covered by oil paper and exhausts out through the chimney located in the opposite side of the fire place. The regurgitation of the exhausted gases by weather conditions, poorly built chimney and broken flues take place and finally leak into the room through the door or broken floor pad.

Authors designed monoplace hyperbaric chamber (Fig. 1) in 1965 and the hyperbaric chamber unit was opened in Seoul National University Hospital on 19th, January, 1969, under author's responsibility.

It has been more than 13 years since the initiation of the Hyperbaric Chamber Unit and recovery from CO poisoning by hyperbaric oxygen therapy for 10 years 1969 to 1978 is summarized in Table 1. Among 2,242 CO poisonings, only 40 cases failed to get recovered by hyperbaric oxygen therapy and the recovery rate through 10 years period was 98.2%.

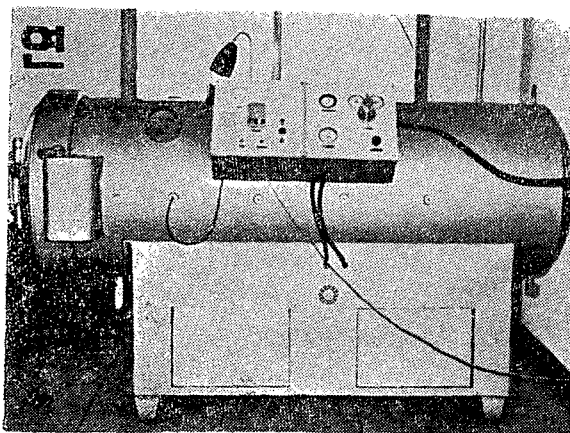


Fig. 1. Hyperbaric Chamber, Monoplace. (Designed by Yun, D.R., 1965)

Table 1. Recovery from Carbon Monoxide Poisoning by Hyperbaric Oxygen Therapy*

Year	No. treated	No. recovered	No. expired	Recovery rate
'69	223	230	3	98.7%
'70	201	197	4	98.0
'71	202	200	2	99.0
'72	306	302	4	98.7
'73	365	358	7	98.1
'74	328	322	6	98.2
'75	194	189	5	97.4
'76	202	196	6	97.0
'77	148	146	2	98.6
'78	63	62	1	98.4
Total	2,242	2,202	40	98.2

* Data from S.N.U.H., Korea, 1969-1978.

The seasonal variations of the CO incidence is presented in Fig. 2. The highest incidence was observed in winter season when the coal briquette shows the highest consumption.

Age and sex distribution of the CO poisoning cases are shown in Table 2. Peak age group is from 15 years to 29 years in both sex ratio is 1 : 1.32. This findings are indicating the liability of young, working population to the accidental CO poisoning in urban area. Also, there seem more risks for Korean women to the CO exposure in their household environment.

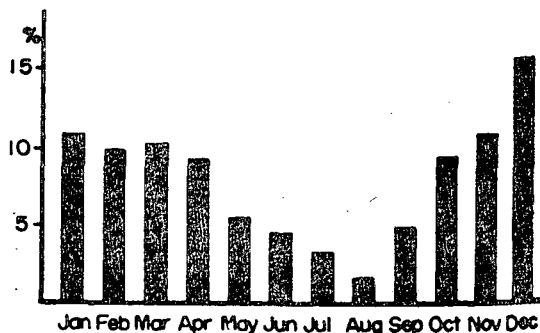


Fig. 2. Number of Carbon Monoxide Poisoning Cases by Month (S.N.U.H., 1969-1978).

Table 2. Age and Sex Distribution of the Carbon Monoxide Poisoning Cases Treated by Hyperbaric Oxygen Therapy*

Age	Male		Female		Total	
	No.	%	No.	%	No.	%
0-14	55	5.7	62	4.8	117	5.2
15-29	514	53.3	668	52.3	1,182	52.7
30-44	195	20.2	193	15.1	388	17.3
45-59	99	10.3	148	11.6	247	11.0
60-	93	10.0	198	15.5	291	13.0
unknown	8	0.8	9	0.7	17	0.8
Total	964	100.0	1,278	100.0	2,242	100.0

* Data from S.N.U.H., Korea, 1969-1978.

In the review of admission rate by arrival time to the unit (Table 3), the arrival time seems to be a good index in predicting the prognosis, because the lower admission rate means the higher discharge rate on the 1st hospital day with complete recovery.

Table 3. Admission Rate of the Carbon Monoxide Poisoning Cases by Arrival Time*

Arrival time	No. of cases	No. of admission	Rate of admission
- 4:00	32	3	9.4%
4:00- 6:00	61	5	8.2
6:00- 8:00	115	17	14.8
8:00-10:00	202	24	26.7
10:00-12:00	118	52	44.1
12:00-14:00	40	23	57.5
14:00-16:00	36	15	41.7
16:00-	37	15	22.4
Total	671	184	27.4

* Data from S.N.U.H., Korea, 1969-1973.

The complications of admitted cases are presented in Table 4. Acute decubitus is the most frequent complication, followed by pulmonary complications and neurologic disorders.

At present, there more than 150 hospitals operating Hyperbaric Chamber Unit in Ko-

Table 4. Complications of Admitted Cases*

Complications	No. of cases	Percentage
Pulmonary edema & aspiration pneumonia	29	34.1%
Trophic changes such as decubitus, burns & myositis	31	36.5
Neurologic disorders	20	23.5
Psychologic disorders	5	5.9
Total	85	100.0

* Data from S.N.U.H., Korea, 1969-1973.

rea. All of the chambers are a monoplace type and most of them have been manufactured by author's design. This extraordinary generalization of Hyperbaric Oxygen Therapy in Korea is unquestionably due to the explosive outbreak of CO poisoning by unique heating system and by unfavorable domestic fuel like the anthracite coal briquette.

As the clinical applications of Hyperbaric Oxygen Therapy are expanding, more extension in the clinical trial of Hyperbaric Oxygenation other than CO poisoning is getting to be a new task of the people working in this field.

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