

Characteristics of Respiratory Diseases in Older People

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Abstract: Pneumonia among old people is the fourth leading cause of death, and its mortality has remained the same for the last 100 years despite development of antibiotics. We have elucidated the onset mechanism of pneumonia among old people and developed methods for its prevention. Its primary cause is considered to be cerebrovascular disorders in the basal ganglia, and absence of substance P causes sub-clinical aspiration, which in turn causes pneumonia. Prevention of pneumonia is now possible without the use of antibiotics by increasing substance P. As old people are immune-compromised by depressed state, measures against depression are important for preventing infections such as pneumonia and common cold. The older the patient is, the more intense the effect of gene appears. It was shown that elderly persons with L polymorphism of heme oxygenase (HO)-1 gene are more susceptible to pulmonary emphysema. Systemic examination of the elderly, particularly their physiological characteristic, is essential for treatment of elderly persons with respiratory diseases.

Key words: Silent cerebral infarction; Immune function;
Polymorphism in gene; Depressed state

Introduction

For young people, treatment of a single affected organ cures a disease while in elderly people, one should always be conscious of the relation to the entire body even when treating, for instance, a single respiratory disease. This paper discusses systemic treatment of respira-

tory diseases that are characteristically seen in the elderly.

Cerebrovascular Disorders and Pneumonia

Pneumonia in young people is exogenous and is described as community-acquired pneumonia

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Table 1 Effect of Oral Care on Incidence of Pneumonia and Mortality by Pneumonia

Groups	No. of patients	Age	Gender (F/M)	Previous ADL	Previous MMS	No. of febrile patients(%)	No. of pneumonia patients (%)	No. of deaths (%)
Received oral care	184	82.0 ± 7.8	148/36	16.3 ± 6.5	13.6 ± 6.9	27** (15)	21* (11)	14** (7)
Did not receive oral care	182	82.1 ± 7.5	145/37	16.2 ± 6.7	13.9 ± 6.9	54 (29)	34 (19)	30 (16)

* $p < 0.05$, ** $p < 0.01$

(Reference 9)

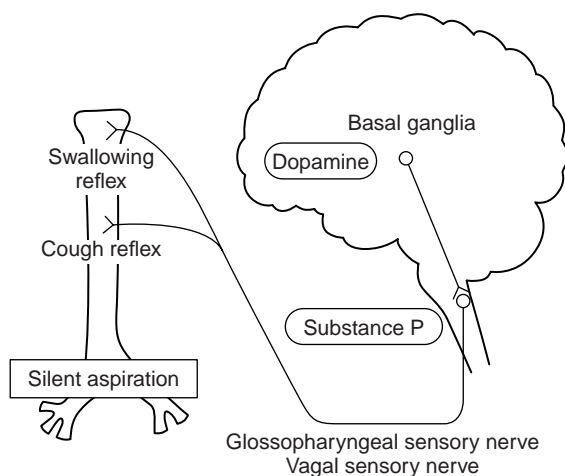


Fig. 1 Silent aspiration is caused by cerebrovascular disorder in the basal ganglia. (Reference 4)

while that of old people is indigenous and nosocomial. Treatments against pneumonia in them are usually described based on the incidence of MRSA, etc. Since healthy subjects are not at all affected even when they are surrounded by MRSA, prevention of pneumonia in old people needs elucidation of their defense mechanism against infection and taking appropriate prevention. Old persons develop pneumonia by sub-clinical aspiration of bacteria in the oral cavity. Prevention of pneumonia in the elderly consists simply of preventing silent aspirations.

Silent aspiration occurs by impaired swallowing reflex¹⁾ and cough reflex²⁾ (Fig. 1). These reflexes become impaired as a result of decreased reverse distribution of substance P that is syn-

thesized at the cervical ganglion of the vagal sensory nerves.³⁾ Production of substance P is decreased by a decrease in dopamine production in the nigrostriatum.⁴⁾ Dopamine production is decreased by basal ganglion infarctions. In other words, cerebrovascular disorders are the underlying disease for repeated silent aspirations that lead to pneumonia in the final analysis.⁵⁾

Identifying the causal bacteria and selecting antibiotics are not a positive method for prevention of pneumonia since pneumonia is recurrent and MRSA appears. Promoting increases of substance P and dopamine is necessary to prevent silent aspirations.

A small amount of capsaicin in the oral cavity will produce a large amount of substance P, which in turn improves swallowing reflex. Use of ACE inhibitor (Tanatril[®]) inhibits the substance-P-decomposing-enzyme, raises the concentration as substance P remains undecomposed, and improves swallowing and cough reflexes.⁶⁾ Administration of ACE inhibitors for two years decreased the incidence of pneumonia to 1/3⁷⁾ while that of amantadine, which stimulates dopamine synthesis, for three years decreased the incidence to 1/5.⁸⁾

Aspiration does not induce pneumonia if there are fewer oral bacteria. The incidence of pneumonia in the group receiving oral care for two years lowered by about 40% (Table 1). While the survival ratio of elderly pneumonia patients in welfare nursing homes is as low as 20% even under treatment by antibiotics, the

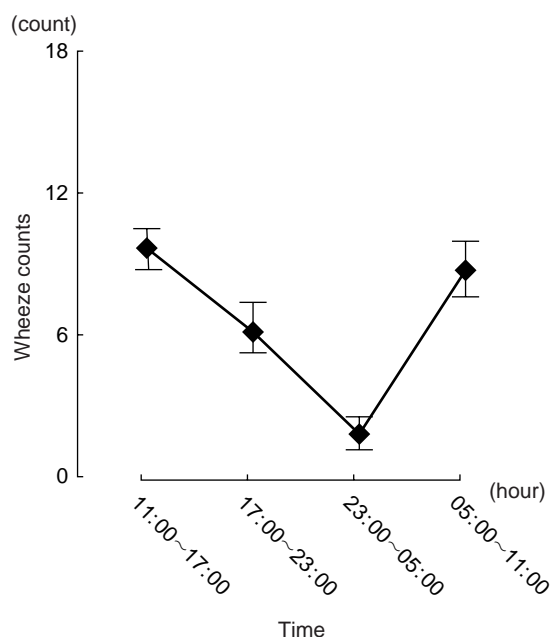


Fig. 2 Wheezing disappears during nocturnal sleep. (Reference 13)

incidence of death by pneumonia decreased by almost half by oral care.⁹⁾ There are many phases in geriatric medicine where nursing care is superior to medical care.¹⁰⁾

Sleep and Respiratory Diseases

The influence of sleep on respiratory diseases is evident in old people, but hardly observed among young people. Almost 50% of those aged 65 and older have cerebrovascular disorders, and swallowing¹¹⁾ and cough reflexes¹²⁾ are suppressed at night when they are asleep, thus decreasing coughing. Silent aspirations therefore occur during nocturnal sleep and pneumonia develops. Mild sleeping pills administered to the elderly patients when they complain of insomnia do not create problems, but strong pills (which also inhibit dopamine production) lower the swallowing reflex and induce pneumonia.

Asthma attacks tend to occur at night and are therefore called nocturnal asthma. This is, however, based on reports by patients, nocturnal wheeze did disappear during sleep by examina-

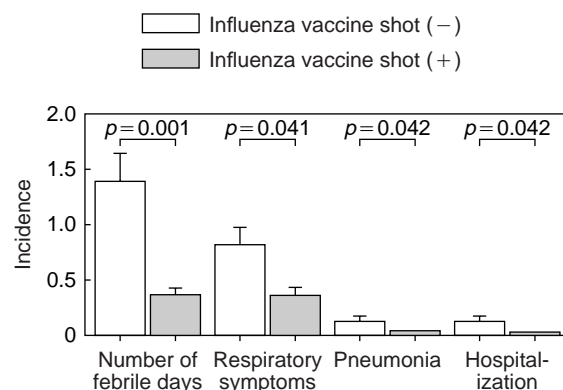


Fig. 3 Influenza vaccine shots to bed-ridden patients shortened durations of febrile days, respiratory conditions, pneumonia, and hospitalization. (Reference 16)

tion actually conducted at night (Fig. 2). Thus, it transpires that there is no nocturnal asthma.¹³⁾ This may be attributable to the fact that the nerve control is lifted when the brain is asleep.

Immunity in the Elderly

It is not yet known how immunity changes with ageing. Immunity comprises cellular immunity represented by helper T₁ lymphocytes and humoral immunity represented by helper T₂ lymphocytes. In elderly people leading active life, both types of immunity remain unsuppressed. But in the bed-ridden elderly, cellular immunity is suppressed, making them more susceptible to pneumonia.¹⁴⁾ But their humoral immunity is not suppressed. Thus, a single dose of influenza vaccine raises influenza antibody titer in them as in young people,¹⁵⁾ and actually shortens the durations of febrile days, of poor respiratory tract conditions, of pneumonia, and of hospitalization (Fig. 3).

Since the antibody titer rises even in bed-bound patients, it was concluded that influenza vaccine should be administered.¹⁶⁾

The Elderly and Genes

The incidence of genetic diseases rises among older people rather than in young people. Weak

Table 2 Polymorphologic Genes of Heme Oxygenase (HO)-1

Allele class	No. of emphysema patients (%)		Odds ratio (95% CI) versus allele			
	Without CPE (%) <i>n</i> = 200	With CPE (%) <i>n</i> = 202	All other classes	S	M	L
L	20 (10)	42 (21)	2.4 (1.3~4.1) ^a	2.9 (1.6~5.3) ^b	2.0 (1.1~3.6) ^c	1.0
M	88 (44)	93 (46)	1.1 (0.7~1.6)	1.5 (0.9~2.2)	1.0	
S	92 (46)	67 (33)	0.6 (0.4~0.9) ^d	1.0		

CPE: chronic pulmonary emphysema (Reference 17)
^a*p*<0.004 ^b*p*<0.001 ^c*p*<0.03 ^d*p*<0.02

factors are largely amplified by ageing. Old people often develop pulmonary emphysema, and since smoking is an important environmental factor, young people are recommended not to smoke. However, as there are people who live to be hundred years old even when they do not quit smoking, people do not quite appreciate the importance of stopping to smoke.

Active enzymes generate by smoking, and polymorphism in heme oxygenase-1(HO) promotes dissipation of active enzymes. Polymorphism in HO-1 gene induces pulmonary emphysema by smoking if HO-1 is reduced.¹⁷⁾ Table 2 shows that those with class L alleles of HO-1 are more susceptible to pulmonary emphysema. This kind of gene analysis may be useful in persuading such people to stop smoking even when they are young.

Thus, a characteristic feature of geriatric diseases is that genetic anomalies become clear by ageing and are expressed as diseases such as pulmonary emphysema.

Depressive State and Respiratory Diseases

Confucius said 2300 years ago that “the spirit

Table 3 Incidences of Cold Among Depressed and Not Depressed

Depressed state	Incidence of cold (%)		Odds ratio (95% CI)	<i>p</i>
	–	+		
Depressed (<i>n</i> =68)	21 (30.9)	47 (69.1)		
Not depressed (<i>n</i> =40)	5 (12.5)	35 (87.5)	3.3 (1.1~9.9)*	0.03

*adjusted by age and gender

(Reference 19)

becomes stable with ageing”. An extreme case of depressed state is manifested as suicide. The age of those committing suicide reaches a peak at 60, but suicide may be described as a disease of old people with its incidence per population increasing with advance in age. In 1999, 32,000 people committed suicide, a cause of death occupying the close-to-fifth 6th position.

When a person is depressed, glucose metabolism is suppressed in the limbic system.¹⁸⁾ Those who are depressed are more susceptible to common cold than others by three times¹⁹⁾ (Table 3). They are also more susceptible to cancer than smokers by five times, demonstrating the fact that mental depression affects systemic diseases including respiratory diseases. As indicated by the increased number of suicide with advanced in age, old people are more prone to depression, and depression induces systemic diseases, thus completing a vicious cycle.

What then can we do to decrease the incidence of depression among old people? According to researchers working on artificial intelligence, a brain that merely eats, walks, and urinates is a brain of the poorest quality. It eats, but instantly forgets that it ate. It walks like humans, but it urinates in the alcove of a drawing room. Thus, an inadequately functioning brain is acceptable if it can pass information to other functions of the brain. Those who need assistance in eating meals but can say “thank you” are superior.

Old people tend to think within their limited sphere, as they receive limited information. If they could share their abilities with others, especially young people, teach them to lead a better life, they would be regarded as good old people.

However, there must be lots of people who approach young people trying to be useful but who are not respected by young people. Old people should not expect returns from young people. Try to clean streets in front of your house as well as of your neighbors every morning. Young people may have little regard to this service, but would not speak ill of you. If you find a restaurant with few clients, you should visit it maybe once a week and order something light. The owner would notice your presence and may become friendly. When you see a long line of empty taxis waiting for customers in front of a station, you should take one maybe once a week and give the driver a chance to earn the fare instead of taking the customary free bus ride. If an airplane is empty with a few passengers and lots of cabin attendants, you should fly maybe once a year. Japanese airlines are now ready to welcome the elderly even when they are on wheel chairs. If there are lecture meetings, attend them by all means. This will please young people sponsoring the lecture.

Thus, all these things keep old people busy that they have no time to become depressed. Old people are not necessarily pressed for money. Their activities in the end benefit the young people. To stay at home always for fear of giving extra trouble to young people does not benefit them. As the years go by, the number of active old people increases. Longevity is an intensive result of accumulation of culture and the basis for respect by the entire world even if old people are living in modest houses.

Conclusion

Medical care for respiratory diseases of the elderly has just entered a new era as comprehensive medicine including mental activities

has started.

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