

わが国、殊に秋田県におけるボツリヌス菌 による食中毒の疫学

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次に掲げる論文は、1968年7月11日より5日間、ハワイのホノルルで開催された日米共同協議会の席上発表したものであるが、そのうち臨床に関する部分が未だ国内誌に発表していないので、特に此处に掲載することとした。わが国におけるボツリヌス菌による食中毒はB型による2発生例を除いて全部がE型によるものである。欧米にはA型、B型による食中毒のみでなく、E型、F型によるヒトの食中毒もあるが、臨床所見に差違があるものかどうか疑問のあるところであるが、さしあたりE型によるボツリヌス菌食中毒における臨床所見を記して大方の参考に供したい。

EPIDEMIOLOGICAL OBSERVATIONS ON BOTULISM IN JAPAN, ESPECIALLY ON THE PRESENT STATUS IN THE AKITA PREFECTURE

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CLINICAL SYMPTOMS AND SIGNS OF BOTULISM IN JAPAN

There has been a topic that when a poisoning due to izushieating is occurred, one must loose his life, among the people near the Lake Hachiro. Probably that topic may point out the botulinal poisoning. From this episode it is comrehensive that mortality of izushi-poisoning is not low.

Already stated, since 1951, 319 botulinal patients and 83 deaths until now are reported in Japan. Out of them were the cases selected, whose clinical descriptions were relatively detailed, and the frequency of clinical symptoms and signs were studied.

(A) Morbidity

As in the Table 1 shows, the total average morbidity ia 57.4 per cent, but there is regional differences in it from 53.5 per cent (Hokkaido) to 100.0 per cent (Yamagata).

(B) Mortality

There is also some differences among the regions, it is 18.5 per cent in Hokkaido, 40.0 per cent in Akita, 47.1 per cent in Aomori, 62.5 per cent in Iwate, and 100.0 per cent in Yamagata. The mortality in Hokkaido is lowest of all, perhaps because of the antiserum therapy.

(C) Incubationtime

As in the Table 3 shows, the longest incubationtime (average)

Table 3 The Period of Incubation of Botulism in Japan (143 cases)

Area	No. of cases	Average Period of incubation (hr)
Hokkaido	70	20.2
Akita Pref.	59	17.5
Aomori Pref.	10	19.7
Iwate Pref.	3	15.3
Yamagata Pref.	3	17.3

was in Hokkaido 20.2 hr, and the shortest was 15.3 hr in Iwate, and the total average was 18.9 hr.

(D) Sex and Age of Patients

Among 165 cases of botulinal patients, 74 were male and 91 were female, that is female are more than male, but it seems to be no special meaning.

According to the classification by age, as in the Table 4 shows, patients are much in middle age, and less in young and old. But it is noticeable that that there were nine young patients under nine years old, especially one boy and one girl were both four years old respectively.

Table 4 Botulinal Patients Japan, by Sex and Age (165 cases)

	Sex	Ages								Total
		0 ~ 9	10~19	20~29	30~39	40~49	50~59	60~69	70~	
Hokkaido	M	—	3	8	8	4	6	4	—	33
	F	3	5	10	7	8	5	4	—	42
Akita	M	—	4	5	2	3	9	3	1	27
	F	2	2	3	8	7	7	2	1	32
Aomori	}	M	—	1	6	1	1	4	—	14
Iwate										
Yamagata										
	F	3	—	3	3	2	3	3	—	17
Total	M	1	7	14	16	8	16	11	1	74
	F	8	7	16	18	17	15	9	1	91
Total (M, F)		9	14	30	34	25	31	20	2	165

(E) Seasonals of Incidence

In ancient time "izushi" was processed in general in winter, and at that time izushi had a meaning of "winter food stuff", but in accordance with the abundance of foodstuff, izushi has become to be preserved in other seasons and to have the meaning of subsidiary articles of food. As the seasonal incidences of botulism are recorded in the Table 5, 7 cases in spring, 11 cases in summer, 31 cases in autumn, and 8 cases in winter. The botulism in Japan is most frequent in autumn. Most of the farmers in Japan plow rice field, and the most busy season for them is late spring or early summer and autumn. The botulinal poisoning is also apt to happen in such busy seasons,

Table 5 The Seasonal Incidences of Botulism in Japan (57 cases)

Month	Jan.	Febr.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Hokkaido	2	1	2		3	2	3	1	3	7	6	5	35
Akita					1	4			2	5	1		13
Aomori									2	3	1		6
Iwate					1					1			2
Yamagata								1					1
Total	2	1	2		5	6	3	2	7	16	8	5	57

because farmers make willingly izushi to save time in kitchens.

(F) The Interval from Onset till Death in Botulinal Cases

As in the Table 6 is shown, the time from the beginning until death is somewhat different due to the areas. The shortest interval was 8.0 hr (Iwate), and the longest was 27.9 hr (Aomori). The average time was 21.0 hr.

Table 6 The Interval from the Beginning until Death in Botulism in Japan (61 cases)

Area	No. of deaths	Average Interval Time (hr)
Hokkaido	25	22
Akita Prefec.	23	20.5
Aomori Prefec.	7	27.9
Iwate Prefec.	3	8.0
Yamagata Prefec.	3	14.0
Total	61	21.0

(G) Clinical Signs and Symptoms in Botulinal Cases

Hitherto in the cases of botulinal patients were the following signs and symptoms marked: bellyache, nausea and vomiting, diarrhea (—gastrointestinal symptoms), and obstipation, vertigo, double vision, midriasis, ptosis palpebrae, swallow difficulty, dyspnea, dysarthria, numbness of whole body, and others (—neurological signs)

But there are some fear to miss the symptoms and signs, of which patients did not complain.

The frequencies of symptoms and signs of 129 botulinal cases are follow s:

Nausea and vomiting	85.3% (110 cases)
Diarrhea	19.4% (25 ")
Obstipation	23.3% (30 ")
Headache and dull head	17.8% (23 ")
Vertigo	9.3% (12 ")
Bellyache	41.9% (54 ")
Languor of whole body	32.6% (42 ")
Chill and shiver	10.9% (14 ")
Fever	6.2% (8 ")
Eruption	1.5% (2 ")
Convulsion	2.3% (3 ")
Thirstiness	73.6% (95 ")
Dysarthria	34.1% (44 ")

Distress in thorax	3.1% (4 ")
Dyspnea	38.0% (49 ")
Abdominal meteorism	61.2% (79 ")
Unpleasant feeling in belly	2.3% (3 ")
Numbness of extremities	57.3% (74 ")
Hoarse voice	42.6% (55 ")
Retentio urinae	14.7% (19 ")
Ache of joint	0.8% (1 ")
Eye disorder	87.6% (113 ")
Weak tendon reflex	0.8% (1 ")
Low blood pressure	7.8% (10 ")
Dry cornea	0.8% (1 ")

Eye disorder is one of the principal sign or symptom of botulism, but the simple expression "eye disorder", or "eye symptom and sign" is not proper. Because such expression does not show the outer or inner signs of eye ball. Fortunately, the clinical reports of 97 cases out of 129 are written in detail, and the frequency is rearranged. The results are follows:

Amblyopia	78.4% (76/97)
Double vision	44.3% (43/97)
Ptosis palpebrae	40.2% (39/97)
Pupil reflex disturbance	19.6% (19/97)
Midriasis	52.6% (51/97)
Nystagmus	1.0% (1/97)

Now, according to the frequency, the symptoms and signs shall be arranged in the following order: nausea and vomiting(85.3per cent), amblyopia(78.4 per cent), thirstness (73.6per cent); belly swelling or meteorism(61.2 per cent); numbness of extremities (57.3per cent); midriasis(52.6per cent); double vision(44.3per cent); hoarse voice (42.6per cent); bellyache(41.9per cent); dyspnea(38.0per cent); and so on.

Out of the above mentioned symptoms and signs, gastrointestinals appeared at first, and then neurologicals appear secondly in general, but at times gastrointestinal symptoms signs miss, or both appear simultaneously.

Chill and fever are not often, and the frequency was 10.9per cent, but fever did not come always. Those who suffered from fever were 8 cases (6.2per cent); and the temperature was from 37.0 C to 42.0 C, but it was rare to reach 38.0 C and over.

Convulsion appeared in three cases(2.3per cent); but in 4 cases at Hamamasu case (44per cent); but the clinical state was not in detail. All three in the Akita cases(Futto and Haginari) were adults, two were male and 63 and 26 years old, the other one was female and 57 years old.

As mentioned above, patients appeal mostly at first on their severe pains, and doctors also mark the noteworthy signs and symptoms at the emergency. Therefore, mild ones are often overlooked. For instance, there was no case who complained of dys- or anosmia according to the numbness of *N. olfactorius*. Also there is no report that *N. olfactorius* was not affected by botulinical toxin.

The affection of *N. opticus* led to amblyopia or mist sight (78.4per cent), but there was no amaurotic case.

There was the affection of *N. abducens*, *N. trochlearis*, and as the result appeared double vision in frequency of 44.3 per cent. The affection of *M. sphincter pupillae* provoked midriasis(52.6per cent), but there was no case who showed myopia nor stiffness of pupils among 129 cases, but I believe there can be myopia, be it of transient nature.

There were seven cases of anisocoria (29.2per cent) among 24 cases of the outbreak at Toyotomi in Hokkaido.

Ptosis palpebrae was seen in 39 cases(40. per cent), and nystagmus was seen only one case(male,41years old), but no detailed report.

There was no report on the affection of taste, chewing and hearing, nor of facial palsy.

The affection of *N. glossopharyngeus*, and of *N. hypoglossus* cause difficulty of swallowing and motoric dysarthria, and when the numbness *N. vagus* were associated, cause the numbness of vocal cords, difficulty of utterance, and at the last stage inspiratory dyspnea(38.0per cent).

Vertigo was seen also and its frequency was 9.3 per cent(12/ 126).

The numbness of *N. trigeminus* provokes the low lachrymal secretion and finally the dry cornea(1.0per cent), and also nose-obstruction(54.2per cent at the Toyotomi case).

The numbness of vagal nerve in accompanying with the affection of spinal sympathetic cause the suppression of oesophageal motion and dilatation of oesophagus and with help of the numbness of *N. glossopharyngeus* and *N. hypoglossus* cause the difficulty of swallowing (45.0 per cent). The oesophageal dilatation was verified in one case at the Ashizawa outbreak (56 years old male), and this has accompanied the elevation of diaphragm.

Swelled abdomen(meteorism) was seen in 79 cases(61.2 per cent) according to the numbness of *N. parasympathicus* and the weakened peristaltic motion provoke persistent obstipation(23.3 per cent).

Unconsciousness was seen in no case, but at the agonal stage is another.

As complications were the suppuration of gingiva and pharynx, glottitis, etc., and some times urticaria-like eruption is recorded.

When the patients have regained happily, some symptoms last relatively for a long time, such as thirsty, weakness of whole body, swelling of abdomen or meteorism, soreness of pharynx, midriasis, amblyopia, etc., but they faded away gradually with time.

Of course it is required at the onset of botulism to differentiate botulism from other diseases, for instance, from stroke, acute bulbar paralysis, appendicitis, obstruction of intestine, etc., and there were actually laparatomies reported in the past.

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