WEEKLY EPIDEMIOLOGICAL REPORT

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Lightning injuries (Part II)

This is the second in the series of two articles on lightning injuries.

Effects of lightning

Lightning provides our daily need of the element nitrogen through the food chain. The excessive electrical energy of lightning converts nitrogen into nitrate. Then nitrate fall on the ground with rainwater and are absorbed by trees.

In spite of this important effect, lightning could damage many organs or systems in the body including most serious damage to the cardiovascular and central nervous systems. Sudden death may occur due to lightning due to cardio respiratory arrest. Circulatory collapse is common with direct hits of lightning. Both fluctuations of blood pressure and the autonomic instability are possible outcomes after lightning. Other adverse effects include cardiomyopathy, atrial fibrillation, and pericarditis. Those above effects may resolve within three days except pericarditis. Pericarditis usually may persist several months after the initial injury.

Injuries to the nervous system include loss of consciousness, seizure, headache, paraesthesia or weakness, confusion and memory loss. They are transient and permanent neurological symptoms include peripheral nerve lesions and cerebral infarction. Progressive myelopathy and sensory loss can also occur several months after initial injury.

Lightning can lead to partial or full thickness burns. It is believed that the place of skin where the lightning current exits from the body becomes a burn. Ocular injuries are also common and the lens is the most frequently injured part of the eye. Cataracts may be the commonly observed complication among victims after a few days or sometimes after a few years. Rupturing of the tympanic membrane can also occur. Deafness is common but usually it is transient. Most frequently arising psychiatric problems are depression, sleep disturbances, emotional impairment and aggressive behaviour. Memory loss and poor concentration ability can also be noticed.

Buildings or tall structures struck by lightning may be damaged as the lightning seeks unintentional trail to the ground. Animals are more susceptible victims to be affected by lightning as they are generally placed outdoors even in heavy rains.

Prevention and protection from of lightning injuries

The followings are some recommendations to help to reduce the effects of lightning in an indoor and outdoor environment.

Preventive measures for the outdoor settings

- Avoid being outside in open spaces during thunderstorms. If you hear thunder, you are in range for a lightning strike. You need to seek

Contents *Page*

1. *Leading Article – Lightning injuries (Part II)* 1
2. *Summary of selected notifiable diseases reported (06th – 12th February 2016)* 3
3. *Surveillance of vaccine preventable diseases & AFP (06th – 12th February 2016)* 4

shelter immediately if you are outside. E.g. Inside a building or a closed vehicle.

- Do not stand underneath highest elevation areas and tall objects. Always move away from signal towers and isolated trees.
- Do not carry or hold tall metal objects during thunderstorms.
- If lightning has struck the immediate area, remember that lightning can strike the same place twice.
- Avoid water environment. Do not bathe in an open pool and do not row a boat during lightning.
- If you cannot find shelter, crouch down in a catcher's stance. Put your hands on your knees or place them over your ears to protect against hearing damage from thunder.

Preventive measures for the indoor settings

- Close all windows and stay away from them.
- Do not use any electrical or electronic equipment. Lightning may strike outside lines and travel inside.
- Do not use the land-line telephones.

Protection from lightning injuries

Historical background of lightning protection system

In 1752 Benjamin Franklin performed the famous experiment of flying kite up to a thunder cloud and proved that lightning strike was a discharge of a huge amount electricity. He invented the lightning rod and his first theory was that the sharp pointed metal rod on a building would provide a safe path for lightning.

Also, most ancient lightning conductors can be found in Sri Lanka in places like the Anuradhapura kingdom that dates back thousands of years. Most Sinhalese kings, who mastered the art of construction of temples and advanced building structures, installed a metal tip made of silver or copper on the highest point of those buildings.

Lightning protection system

Lightning protection can improve security from lightning strikes by decreasing the likelihood and strength of indoor lightning shocks. It provides a specified path on which lightning can travel to the ground. Lightning protection system connected to the building includes a network of the lightning rod (air terminal), braided conductor (cable) and ground termination. A lightning rod is a metal strip, connected to the earth through conductors. Lightning arresters, which are fixed to the electric power transmission systems and telecommunication towers, are helping to protect those systems.

Alertness on weather forecast

High winds, increased rainfall and a darkening cloud cover are the warning signs for possible cloud-to-ground lightning strikes. Therefore alert on local weather pattern and current weather forecast is the essential first step to prevent being struck by lightning.

First aid measures if lightning strikes a human

Lightning hazards are not fatal at all times and there is no risk in touching the victim unless the person falls on electric cables. The damage is determined by the path of the discharge of lightning through the body and the intensity of the current. It is essential to provide first aid measures immediately after the incident to save life before seeking medical treatment for the victim. Providing cardiopulmonary resuscitation is a must if it is disturbed.

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Table 1: Selected notifiable diseases reported by Medical Officers of Health 06th – 12th Feb 2016 (07th Week)

RDHS Division	Dengue Fever		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human Rabies		Chickenpox		Meningitis		Leishmani-asis		WRCD	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	T*	C**
Colombo	351	2863	1	20	0	0	1	10	0	0	8	19	0	2	1	6	0	0	5	54	0	5	0	0	**69**	**81**
Gampaha	46	981	2	5	0	4	1	5	0	0	1	25	0	4	0	11	0	0	1	65	1	9	1	2	**40**	**73**
Kalutara	75	456	4	17	0	0	1	6	4	5	6	68	0	3	0	2	0	0	6	38	3	10	0	0	**79**	**93**
Kandy	50	425	1	21	1	7	2	7	2	9	7	49	1	11	1	13	0	0	3	21	2	6	0	4	**87**	**91**
Matale	8	71	0	7	0	1	1	4	0	0	0	27	0	8	2	4	0	0	1	6	0	14	0	10	**54**	**85**
NuwaraEliya	9	56	3	7	0	1	1	8	0	0	0	10	2	8	1	2	0	0	8	21	1	3	0	0	**100**	**100**
Galle	46	351	4	13	1	3	0	1	0	2	12	70	0	22	0	4	0	0	5	39	1	16	0	1	**95**	**100**
Hambantota	25	139	0	10	0	0	0	0	0	0	5	29	2	22	1	9	0	0	7	37	0	1	11	70	**83**	**92**
Matara	30	187	0	10	0	1	0	1	0	26	1	24	1	12	1	6	0	0	7	37	0	0	2	41	**100**	**100**
Jaffna	74	825	3	47	0	1	2	20	1	13	0	7	36	367	0	1	0	0	6	27	0	5	0	0	**92**	**92**
Kilinochchi	1	15	1	7	0	0	0	11	0	0	0	6	0	8	0	0	0	0	0	0	0	3	0	0	**50**	**75**
Mannar	3	52	0	2	0	3	0	6	0	0	0	7	1	23	0	0	0	0	0	1	0	0	0	0	**80**	**100**
Vavuniya	5	79	0	2	0	0	0	5	0	4	2	8	0	3	0	0	0	0	0	2	0	0	0	2	**50**	**75**
Mullaitivu	2	38	1	4	0	0	0	3	0	0	0	8	0	3	0	0	0	0	1	1	0	1	2	3	**80**	**80**
Batticaloa	12	153	5	60	0	0	1	4	0	1	0	9	1	2	0	3	0	0	1	9	2	3	1	1	**93**	**93**
Ampara	4	40	1	3	0	0	0	0	0	0	2	6	0	0	0	2	1	1	0	4	0	0	1	1	**43**	**71**
Trincomalee	14	129	4	13	0	0	2	3	0	0	0	2	0	4	0	20	1	1	6	25	1	2	0	0	**75**	**83**
Kurunegala	47	317	4	32	0	3	0	0	0	5	1	32	0	4	1	3	0	0	5	49	1	7	3	15	**85**	**96**
Puttalam	49	273	2	7	0	0	0	3	0	0	0	11	2	36	0	0	0	0	2	14	1	7	0	0	**62**	**69**
Anuradhapura	11	121	2	16	0	1	0	0	0	18	4	98	1	8	1	7	0	0	8	34	1	6	2	35	**58**	**89**
Polonnaruwa	16	89	1	9	0	0	0	6	0	0	1	37	0	1	1	1	0	0	4	14	0	2	3	28	**100**	**100**
Badulla	6	97	3	18	1	3	0	1	0	0	5	30	2	12	7	22	0	0	4	22	1	28	0	0	**71**	**94**
Monaragala	9	71	1	8	0	1	0	1	0	0	5	70	3	15	3	25	0	0	3	15	2	9	0	5	**100**	**100**
Ratnapura	34	247	6	25	1	8	0	6	0	5	3	49	1	7	1	24	0	0	1	28	1	24	0	0	**78**	**83**
Kegalle	19	266	0	5	0	3	0	11	0	7	1	45	0	3	0	4	0	0	6	62	0	4	0	0	**73**	**73**
Kalmune	20	165	3	17	0	0	1	3	1	3	1	3	0	0	0	0	0	4	1	11	2	4	0	0	**54**	**85**
SRILANKA	**966**	**8506**	**52**	**385**	**4**	**40**	**13**	**125**	**8**	**98**	**65**	**749**	**53**	**588**	**21**	**169**	**2**	**6**	**91**	**636**	**20**	**169**	**26**	**218**	**77**	**89**

Source: Weekly Returns of Communicable Diseases (WRCD).

*T=Timeliness refers to returns received on or before 12th February, 2016 Total number of reporting units 339 Number of reporting units data provided for the current week: 304 **C**-Completeness

A = Cases reported during the current week. **B** = Cumulative cases for the year.

Table 2: Vaccine-Preventable Diseases & AFP

06th – 12th Feb 2016 (07th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2016	Number of cases during same week in 2015	Total number of cases to date in 2016	Total number of cases to date in 2015	Difference between the number of cases to date in 20156& 2015
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	00	00	00	00	00	00	00	00	00	02	07	09	-22.2%
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	0%
Mumps	02	00	02	02	01	00	02	02	02	13	08	60	51	+18.1%
Measles	04	01	05	00	00	01	00	00	00	11	29	111	189	-41.2%
Rubella	00	00	00	00	01	00	00	00	00	01	00	04	02	+100%
CRS**	00	00	00	00	00	00	00	00	00	00	00	00	00	0%
Tetanus	00	00	00	00	00	00	00	00	00	00	00	01	02	-50%
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	00	00	00	00	0%
Japanese Encephalitis	00	00	00	00	00	00	00	00	00	00	01	00	03	-100%
Whooping Cough	00	00	00	00	00	00	00	00	00	00	03	15	13	+15.3%
Tuberculosis	99	17	39	19	21	34	02	05	20	256	159	1225	1241	-1.2%

Key to Table 1 & 2

Provinces: **W**: Western, **C**: Central, **S**: Southern, **N**: North, **E**: East, **NC**: North Central, **NW**: North Western, **U**: Uva, **Sab**: Sabaragamuwa.

RDHS Divisions: **CB**: Colombo, **GM**: Gampaha, **KL**: Kalutara, **KD**: Kandy, **ML**: Matale, **NE**: Nuwara Eliya, **GL**: Galle, **HB**: Hambantota, **MT**: Matara, **JF**: Jaffna, **KN**: Killinochchi, **MN**: Mannar, **VA**: Vavuniya, **MU**: Mullaitivu, **BT**: Batticaloa, **AM**: Ampara, **TR**: Trincomalee, **KM**: Kalmunai, **KR**: Kurunegala, **PU**: Puttalam, **AP**: Anuradhapura, **PO**: Polonnaruwa, **BD**: Badulla, **MO**: Moneragala, **RP**: Ratnapura, **KG**: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,

Special Surveillance: AFP* (Acute Flaccid Paralysis), Japanese Encephalitis

CRS =**Congenital Rubella Syndrome

AFP and all clinically confirmed Vaccine Preventable Diseases except Tuberculosis and Mumps should be investigated by the MOH

Dengue Prevention and Control Health Messages

Look for plants such as bamboo, bohemia, rampe and banana in your surroundings and maintain them

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