

Application of Snake-Venom and Technology of Antivenom Manufactory

Chien-Hsin Liu^{*}, Chia-jung Lee, Rung Li, Ching-Lun Hsu,
Chao-Hung Chen, Shiao-Chi Chang, Wen-Chin Hsieh

Abstract

The snake venom containing toxic proteins as well as co-enzymes is milked from the venom gland of snake. The composition of venom is very complex for which each individual venom component has particular characteristics of toxicity, pharmacology and can cause different clinical symptoms. Based on pharmacological effects, venoms can be classified into neurological type venom, hemorrhagic type venom and mixed type venom. The knowledge, learned from investigations of venom proteins on pharmacological properties, molecular biology and chemical structure, is applied in the medicinal manufacturing and clinical testing. Recently, peptide compounds with anticoagulation function from snake venoms have been certified as drugs to treat angina, inflammation, diabetes, hypertension, chronic pain and stroke. In order to identify patients bitten by *Bungarus multicinctus* and *Naja atra*, specific antibodies were prepared and purified by mass spectrometry and immuno-precipitation method from our homemade horse anti-plasma, and have successfully identified the toxic protein in the tissue fluid of the patient. Development of this detection technology platform is going to be applied to the clinical differential diagnosis and improve the cure rate for patients. In cases of snakebite poisoning, implementing correct antivenom in time is still the most effective treatment. The horses are commonly used as manufacturing animals in

Center for Research, Diagnostics and Vaccine
Development, Centers for Disease Control,
Ministry of Health and Welfare, Taiwan
Corresponding author : Chien-Hsin Liu^{*}
E-mail : liuch@cdc.gov.tw

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large amounts to prepare antivenoms. Injection of the crude venom to horse stimulates the immune system to generate neutralizing antibodies against toxins, followed by separation of the antiserum, collected from horses, adding gastric proteases (pepsin) to harvest F (ab')₂ fragments after purification, finalized by the vacuum freeze-drying step. Data show that the lyophilized antivenom produced by this process not only is effective in treating patients bitten by domestic snakes, but also is quite low in the occurrence rate of side effects.

Keywords : poisonous snake ; snakevenom ; antivenom

Epidemiological Survey of the Multiple Antibiotic Resistant Human Pathogen *Clostridium difficile*

Yu-Ping Hong^{*1,2}, Zih-Cian Su², I-Hsiu Huang²,
Chien-Chou Lin¹, Ho-Sheng Wu¹

Abstract

Clostridium difficile is an endospore-forming, Gram-positive human pathogen and is the leading cause of antibiotic-associated diarrhea. Ingestion of broad-spectrum anti-microbial agents are often the trigger for *C. difficile* infections (CDI) which result in a wide range of symptoms ranging from diarrhea, pseudomembranous colitis to the lethal toxic megacolon. A major cause of CDI is the disruption of indigenous microbiota by the anti-microbial agents and the presence of *C. difficile* in the gut mucosa which leads to colonization resistance. The two major virulence factors of *C. difficile* are the TcdA and TcdB toxins. The current treatment of CDI first calls for the cessation of broad-spectrum antibiotics, followed by the administration of metronidazole and/or vancomycin depending on disease severity. Currently, *C. difficile* vaccines based on toxoid preparations are under clinical trial but have not been approved to be used for the general public. The emergence of hyper-virulent *C. difficile* strains have contributed to increasing mortality in North America and many other European nations. The incidence in Asian countries is gradually rising as well. Between 2003 and 2007, the number of confirmed CDI patients among the 65 years or older group has increased by 5 to 6 fold. It is pertinent for infection control personnel in hospitals to raise awareness for CDI cases here in Taiwan, and to perform molecular typing when necessary. Since *C. difficile* is known to spread rapidly, increase geographical monitoring of CDIs is also recommended.

Keywords: *Clostridium difficile* ; *Clostridium difficile* infections (CDI) ; indigenous microbiota ; colonization resistance ; molecular typing

¹ Center for Research, Diagnostics and Vaccine Development, Centers for Disease Control, Ministry of Health and Welfare, Taiwan

² Department of Microbiology and Immunology, College of Medicine, National Cheng Kung University, Taiwan

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Corresponding author : Yu-Ping Hong^{* 1,2}

E-mail : Yu-ping@cdc.gov.tw

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Outbreak Investigation on Respiratory Syncytial Virus Infection in a Postpartum Nursing Care Center, Tainan City, 2014

Pei-Yi Lin^{*1}, Wei-Chen Chiu², Yueh-Chun Liao¹,
Chiao-Wen Lin¹, Jen-Te Wang¹, Pi-Long Lio¹

Abstract

Respiratory syncytial virus (RSV) is one of common pathogens that causing respiratory infections in infants and children. Infections can result from droplets containing the virus, and direct or indirect contact the nasal or oral secretions from infected persons. It is highly pathogenic in infants, and easily spread out in high population density institutions. We reported an outbreak investigation on RSV infection in a postpartum nursing care center in Tainan City in 2014. Among 17 infants in that institution, 9 were symptomatic with an attack rate of 52.9%. Respiratory specimens were collected from 5 patients, and RSV was confirmed from these five specimens. Meanwhile, the local health bureau helped that institution to implement infection control measures, including patient isolation, disinfection, hand hygiene, and daily check-up for health status. The relevant suggestions and future improvement were given according to the attitude of the institution, the intervention they had already done, the characteristics of nursing care customers. This event can be a reference for both postpartum nursing care centers and public health dealing with similar outbreaks in the future.

Keywords: Postpartum nursing care centers ; Respiratory syncytial virus ; Outbreak

¹Southern Regional Center, Centers for Disease Control, Ministry of Health and Welfare, Taiwan

²Department of Health, Tainan City Government
Corresponding author : Pei-Yi Lin^{*1}

E-mail : peiyi@cdc.gov.tw

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week 5 (Feb. 1 - Feb. 7, 2015)

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Weekly Data of Notifiable Infectious Diseases (by week of diagnosis)

Classification	Case diagnosis week Disease Diagnosed ¹	Week 5		Week 1—5	
		2015	2014	2015	2014
Category I	Plague	0	0	0	0
	Rabies	0	0	0	0
	SARS	0	0	0	0
	Smallpox	0	0	0	0
Category II	Acute Flaccid Paralysis	1	0	2	5
	Acute Viral Hepatitis type A	2	2	12	17
	Amoebiasis	11	4	34	23
	Anthrax	0	0	0	0
	Chikungunya Fever	1	1	1	2
	Cholera	0	0	0	0
	Dengue Fever	13	8	112	71
	Dengue Hemorrhagic Fever/Dengue Shock Syndrome	0	0	0	4
	Diphtheria	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	0	0
	Malaria	0	0	2	2
	Measles	0	0	0	1
	Meningococcal Meningitis	0	0	0	2
	Paratyphoid Fever	0	0	1	1
	Poliomyelitis	0	0	0	0
	Rubella	0	0	1	0
	Shigellosis	5	5	34	19
Typhoid fever	0	1	3	4	
West Nile Fever	0	0	0	0	
Category III	Acute Viral Hepatitis type B	1	0	11	3
	Acute Viral Hepatitis type C ⁵	4	0	20	1
	Acute Viral Hepatitis type D	0	0	0	0
	Acute Viral Hepatitis type E	0	1	1	3
	Acute Viral Hepatitis untype	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	0	0	1
	Haemophilus Influenza type b Infection	0	0	1	0
	Japanese Encephalitis	0	0	0	0
	Legionellosis	4	0	17	20
	Mumps ²	16	13	70	63
	Neonatal Tetanus	0	0	0	0
	Pertussis	3	0	17	3
	Tetanus ²	0	0	0	0
Category IV	Botulism	0	0	1	0
	Brucellosis	0	0	0	0
	Complicated Influenza	14	106	46	427
	Complicated Varicella ⁴	1	0	6	5
	Endemic Typhus Fever	0	0	0	4
	Herpesvirus B Infection	0	0	0	0
	Invasive Pneumococcal Disease	13	18	91	94
	Leptospirosis	0	2	4	7
	Lyme Disease	0	0	0	0
	Melioidosis	0	0	3	1
	Q Fever	0	0	1	9
	Scrub Typhus	7	5	37	50
	Toxoplasmosis	0	0	0	0
Tularremia	0	0	0	0	
Category V	Ebola Virus Disease	0	0	0	0
	Ebola-Marburg Hemorrhagic Fever	0	0	0	0
	Novel Influenza A Virus Infections ⁶	0	0	0	0
	Lassa Fever	0	0	0	0
	Rift Valley Fever	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus Yellow Fever	0 0	0 0	0 0	0 0

1. The following 8 chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.
 2. Reported cases.
 3. The epidemiological week calendar established by the World Health Organization is adopted for calculating each week's cumulative total.
 4. Since 2014/1/1, "Varicella" was modified to "Complicated Varicella".
 5. Since 2014/3/6, the case definition for confirmed Acute hepatitis C was changed from "meet the clinical and laboratory conditions" to "meet the clinical or laboratory conditions".
 6. Since 2014/7/1, various subtypes of human cases of avian influenza changed to the fifth class of infectious diseases "novel influenza A virus infections". The original "H5N1 flu" and "H7N9 flu" were removed on the same day.

Suspected Clusters

- Sixteen clusters were reported, including 4 tuberculosis clusters, 3 diarrhea clusters, 3 upper respiratory tract infection clusters, 2 varicella clusters, 2 influenza-like illness clusters, and 2 pertussis clusters.

Imported Infectious Diseases

- 14 confirmed cases were imported from 5 countries during week 5 of 2015.

Disease \ Country	Indonesia	Vietnam	Philippines	Madagascar	Australia	Total
Dengue Fever	4	2				6
Shigellosis	3					3
Amoebiasis	2					2
Hepatitis A				1	1	2
Chikungunya Fever			1			1
Total	9	2	1	1	1	14

Note: The statistics listed in this table include imported cases that were either confirmed or updated* in the previous week.

- A total of 74 confirmed cases were imported from 18 countries in 2015.
- Top 3 imported diseases : Amoebiasis (23), Dengue fever (19), Shigellosis (15).
- Top 3 countries responsible for most imported cases : Indonesia (44), Vietnam (7), Philippines (4).

Summary of Epidemic

- **Influenza** : The influenza activity has recently peaked. Since January 1, 2015, a total number of 45 cases of severe complicated influenza have been confirmed, including 39 cases infected by H3N2, 4 cases infected by H1N1, 1 case infected by untyped influenza A and 1 case infected by influenza B. Among these cases, 3 deaths were caused by infection with H3N2. Although the numbers of severe complicated influenza cases, hospitalizations and outpatient/emergency visits for influenza-like illness have all increased, they are all lower than those reported during the same period last year. At the moment, H3N2 is the dominant strain circulating in the community. In terms of viral surveillance, approximately 50% of the H3N2 isolates tested in January are considered as low reactors to the currently used influenza vaccine virus. Thus far, no resistant viruses have been detected.
- **Diarrhea** : The upward epidemic trend has slightly slowed down. Children under six years old are the high-risk population for diarrhea. As we have already entered the viral gastroenteritis season, the public is urged to practice good personal hygiene such as washing hands frequently and reminded to avoid eating raw food and consuming unboiled water to ward off infection.

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