Communicable Diseases WATCH

衛生防護中心 Centre for Health Protection 衛生署 Department of Health

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FEATURE IN FOCUS

Epidemiology of Mumps in Hong Kong, 2014-2018

Reported by Dr Cindy POON, Medical and Health Officer, Vaccine Preventable Disease Office, Surveillance and Epidemiology Branch, CHP.

Mumps is a viral infection spread via direct contact or by droplets from the upper respiratory tract of infected individuals. Mumps infection primarily affects the salivary glands, typically the parotid. Initial symptoms are non-specific, followed within days by the characteristic swelling of the parotid glands. Children between five and nine years old are most commonly affected, but mumps virus can also infect adults, in whom complications such as meningitis and orchitis are relatively more common[1].

Mumps has become a notifiable disease in Hong Kong since 1994. Mumps-containing vaccine, in the form of combined measles, mumps and rubella (MMR) vaccine was first included in the Hong Kong Childhood Immunisation Programme in 1990 and a two-dose regimen has been adopted since 1996. At present, children in Hong Kong are given the first dose of MMR vaccine at one year at Maternal and Child Health Centres of the Department of Health (DH), followed by a second dose at Primary One by the School Immunisation Teams of DH through outreach visits to schools (measles-mumps-rubella-varicella vaccine will be given at Primary One for those born in and after 2013). The overall vaccine coverage for the first and second dose of mumps-containing vaccine has been maintained at above 95% in Hong Kong.

With high vaccine coverage, the number of mumps infection has remained at a low level in Hong Kong. In the past five years (2014 to 2018), a total of 519 cases were recorded by the Centre for Health Protection of DH. The annual number of cases ranged from 82 to 118, giving an annualised incidence of 11.0 to 16.2 cases per million population. The monthly number of cases ranged from one to 18 with no obvious seasonal variation (Figure 1). Most cases were clinically diagnosed and only 37 cases (7%) had laboratory confirmation.

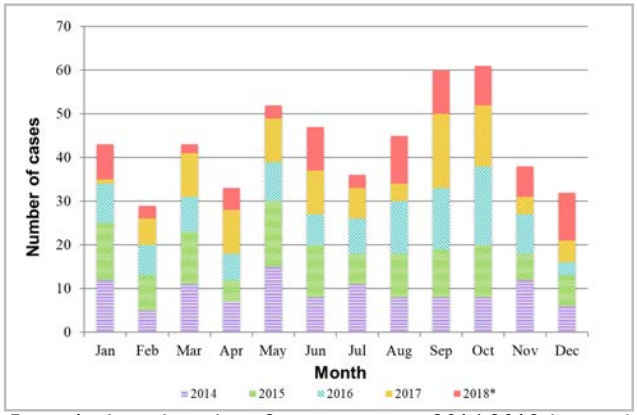

*Figure 1 - Annual number of mumps cases in 2014-2018, by month (*Provisional figures as of January 30, 2019).*

Among the 519 cases recorded, 278 (54%) were males and the age range was one month to 88 years (median: nine years). Older children aged five to nine years and adults accounted for 30% and 39% of all cases respectively (Figure 2). Besides swelling of the salivary glands, clinical manifestations of the cases included fever (39%), runny nose (20%), cough (19%) and myalgia (7%). Only a small proportion (48/519, 9%) of the cases required hospital admission and complications were documented in six cases (all presented with orchitis). Of these six cases, one case had received MMR vaccination, while the remaining five cases did not receive or were uncertain about their vaccination history. No fatal cases were recorded.

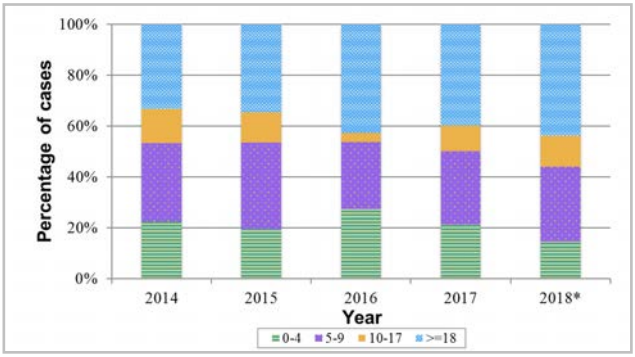

*Figure 2 - Annual number of mumps cases in 2014-2018, by age group (*Provisional figures as of January 30, 2019).*

Only a small proportion of cases (4.0%) had history of travel outside Hong Kong (including Mainland China, Australia, Canada, Indonesia, Nepal, Republic of Ireland and Thailand) during the incubation period. Most of the cases (99%) were sporadic and only two outbreaks were recorded (one in 2015 and another one in 2016). The outbreak in 2015 affected a couple who had no history of travel during the incubation period and had not received the recommended vaccinations/was uncertain about the vaccination history. The source of this outbreak was uncertain. The other outbreak in 2016 affected two gentlemen who were participants of an international sports tournament held in Hong Kong. They had participated in a similar tournament in Vancouver during the incubation period, before they came to Hong Kong. Some other players who took part in the event in Vancouver were also diagnosed to have mumps after they went back to their home countries. The vaccination history of one of the two patients was uncertain, while the other one claimed to have received mumps vaccination.

Mumps infection can be prevented by vaccination. Vaccine effectiveness for the mumps component of the MMR vaccine is around 78% (range: 49 to 92%) and 88% (range: 31 to 95%) for one and two doses respectively[2]. Members of the public are reminded to receive up-to-date vaccination and maintain good personal and environmental hygiene for the prevention of mumps.

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Review of food poisoning related to nitrate and nitrite in Hong Kong

Reported by Dr Hyeon LEUNG, Medical and Health Officer, Enteric and Vector-borne Disease Office and Dr HY LAM, Senior Medical and Health Officer, Outbreak Team, Surveillance and Epidemiology Branch, CHP.

Nitrate and nitrite are naturally occurring compounds that are part of the earth's nitrogen cycle[1]. Nitrate plays an important role in the nutrition and function of plants. The level of nitrate in vegetables is affected by growing conditions (such as light, temperature, growth method and fertiliser use), storage and processing (such as washing, peeling, blanching and boiling) and varies greatly among species[2]. As nitrate tends to concentrate in the leaves of plants, leafy vegetables such as Chinese kale, chrysanthemum greens, lettuce, pak choi, rucola and spinach have been reported to contain high levels of nitrate[2,3]. On the other hand, nitrate is used commercially by the food industry in fertilisers and both nitrate and nitrite are used as food additives. They are added to processed foods such as cured meats, fish and dairy products as preservatives[1]. Nitrate is relatively non-toxic and stable in the environment. However, through biological processes involving plants or microbes, it may be reduced to form nitrite which has adverse health effects to humans[1,3].

Health effects of nitrate and nitrite

Human exposure to nitrate is mainly exogenous through consumption of vegetables or other foods that contain it, while exposure to nitrite is mainly from endogenous nitrate conversion[3,4]. According to a study by the European Food Safety Authority in 2008, the estimated exposures to nitrate from consumption of vegetables are unlikely to result in appreciable health risks[3]. However, overexposure to nitrate and nitrite can occasionally occur via ingestion of water, foods or beverages that contain nitrate or nitrite naturally or as an added preservative[1,3]. For example, improper handling and storage of food may result in the nitrate naturally present in vegetables being reduced to nitrite by bacteria. This is associated with a range of adverse health effects, the most important being methaemoglobinaemia.

Methaemoglobinaemia is a condition in which nitrite oxidises the haemoglobin in blood, making it unable to carry oxygen to body tissues and resulting in the person having insufficient oxygen[1,2]. Patients with methaemoglobinaemia commonly present with bluish discoloration of the skin (a condition known as cyanosis) and may develop increased heart rate, weakness, headache, dizziness, shortness of breath, abdominal pain, nausea and vomiting. Severe cases may result in death[1]. People who are at increased risks of developing nitrite-induced methaemoglobinaemia include infants, who have immature gastrointestinal and methaemoglobin reductase systems, and individuals with glucose-6-phosphate dehydrogenase (G6PD) deficiency[1].

Patients with nitrite-induced methaemoglobinaemia should be treated promptly with supplemental oxygen and haemodynamic support. Methylene blue can be used as an antidote[5]. In severe cases, exchange transfusion should be considered[6].

Global situation

Food poisoning outbreaks related to nitrate and nitrite are uncommon. Inappropriate use of nitrite as food additives and nitrite being mistakenly used as table salt or sugar were common causes of food poisoning related to nitrate and nitrite. In 2013, a home outbreak of sodium nitrite poisoning occurred in Suzhou, Mainland China, when three family members presented with cyanosis, dizziness and increased heart rate after consuming stir-fried asparagus at home. Investigations found that this outbreak was due to the food handler mistakenly using sodium nitrite as sugar[7]. In 2018, a domestic outbreak in the Republic of Serbia was reported, which affected three family members aged 53 to 70. The three patients presented with methaemoglobinaemia after consuming homemade sausages, resulting in death of the oldest patient with underlying illnesses. Investigations found that the nitrite concentration in the sausages involved was almost 30 times higher than allowed, revealing that too much sodium nitrite had been added to the sausages[8].

Local situation

In Hong Kong, food poisoning is a notifiable disease under the Prevention and Control of Disease Ordinance (Cap 599) and food poisoning cases related to nitrate and nitrite are occasionally reported. In the past decade (2009 to 2018), the Centre for Health Protection (CHP) of the Department of Health recorded a total of ten food poisoning cases related to nitrate and nitrite affecting a total of 12 persons (Figure 1). The annual number of cases ranged from zero to four, with each case affecting one to two persons (median: one person).

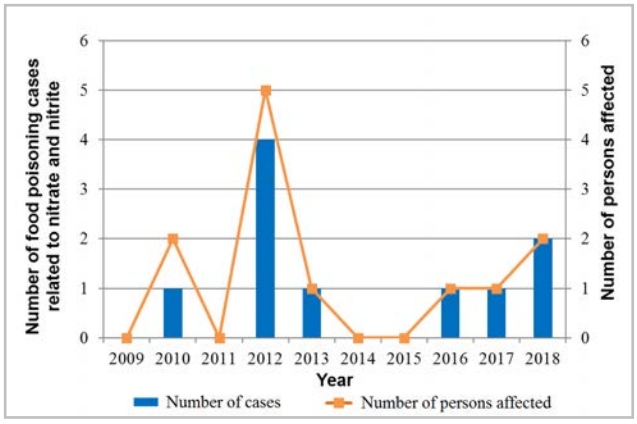

Figure 1 - Annual number of food poisoning cases related to nitrate and nitrite recorded by CHP and the number of persons affected from 2009 to 2018.

The patients involved two males and ten females, with ages ranging from six months to 86 years (median: 50.5 years). Two patients had each suffered from two episodes of food poisoning related to nitrate and nitrite in this period, accounting for four of the total ten cases. Six of the patients (50.0%) were adults aged between 18 and 64 years, while four (33.3%) were below 18 years of age (including one infant) and two (16.7%) were over 64 years of age.

The commonest clinical presentations were cyanosis (7, 58.3%), shortness of breath or oxygen desaturation (6, 50.0%), dizziness (5, 41.7%) and nausea or vomiting (5, 41.7%). Other reported symptoms included drowsiness, weakness and epigastric pain. Upon blood testing, all patients were found to have methaemoglobinaemia. All patients required hospitalisation and four of them (33.3%) required admission to intensive care unit. All patients recovered and no fatal case was recorded.

Regarding risk factors, one patient (8.3%) was a six-month-old infant while another one-year-old patient (8.3%) had documented G6PD deficiency. The high-risk food items consumed by the patients included choy sum (four cases, 40%), spinach (three cases, 30%), leaf lettuce (one case, 10%), preserved vegetables (one case, 10%) and processed meat (one case, 10%). All incriminated food items were consumed locally.

Regarding the two cases of food poisoning related to nitrate and nitrite in 2018, the first case affected a 76-year-old female with history of hypertension, diabetes and renal impairment. She presented with drowsiness, cyanosis of lips and palms and shortness of breath 30 minutes after consuming cooked choy sum and hairy gourd at home in December 2018. She attended the Accident and Emergency Department (AED) and was admitted to a public hospital. Her blood test result was found to have methaemoglobinemia with a blood methemoglobin level of 30.1% (normal level =< 1.5%). Her symptoms improved after treatment with methylene blue and she was subsequently discharged after four days of hospitalisation. Urine toxicology was negative for methaemoglobinemia-inducing agents. Apart from consumption of choy sum, she denied history of taking over-the-counter drugs, Chinese herbal medicines nor health supplements and did not have exposure history to other methaemoglobinemia-inducing agents.

The second case affected a six-month-old girl with good past health. She presented with similar symptoms shortly after consuming a bowl of pureed cooked spinach and potato at home. She was sent to the AED and subsequently admitted to a public hospital and was found to have methemoglobinemia (blood methemoglobin level: 33.4%) on admission. She required management in the paediatric intensive care unit. G6PD screening of the patient was normal. Her urine nitrate-creatinine ratio was found to be high and urine toxicology was negative for other methaemoglobinemia-inducing agents. The findings were compatible with nitrite-related methemoglobinemia. She was treated with methylene blue and her condition improved and was discharged uneventfully. According to the patient's mother, this was the first time the patient consumed vegetables puree.

Prevention of food poisoning related to nitrate and nitrite

Vegetables are an essential component of a healthy diet. Members of the public are advised to take a balanced diet and eat a variety of fruits and vegetables (i.e. leafy vegetables, fruiting vegetables, root vegetables, flowering or head brassicas etc. on different days) so as to avoid excessive exposure to chemicals from a small range of food items.

For infants, the World Health Organization recommends exclusive breastfeeding for those up to six months of age. When complementary foods are introduced, the usual quantity of intake for babies of six to 12 months old is around two to four tablespoons per day. Different types of vegetables including leafy vegetables should be given to infants in rotation to maintain balanced nutrition.

To prevent food poisoning related to nitrate and nitrite, members of the public should:

- ✦ Store vegetables under refrigeration;
- ✦ Wash, peel, and remove the stem, blanch the vegetable before cooking, when appropriate; and
- ✦ Cook vegetables soon after cutting or mashing.

For more information, please visit the website of the Centre for Food Safety of the Food and Environmental Hygiene Department: Food Safety Focus (25th Issue, August 2008) -- Nitrate in Food at:
https://www.cfs.gov.hk/english/programme/programme_rafs/programme_rafs_fc_01_23.html

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NEWS IN BRIEF

A sporadic case of psittacosis

On January 18, 2019, the Centre for Health Protection (CHP) recorded a case of psittacosis affecting a 37-year-old female with underlying illness. She presented with fever, headache, malaise, productive cough and shortness of breath on January 3 and was admitted to a public hospital on January 10. Her chest X-ray showed right lower zone and left middle zone infiltrates and the clinical diagnosis was chest infection. She required intensive care and was treated with antibiotics. Her condition improved and she was discharged on January 18. Her nasopharyngeal aspirate collected on January 11 was tested positive for *Chlamydophila psittaci* DNA. She travelled to Beijing from December 10 to 17, 2018 and did not report any contact history with birds or their excreta during the incubation period. Her home contacts and travel collaterals were asymptomatic.

Symposium on Prevention of Healthcare-associated Infections in Hospitals and Community Institutions, January 16 to 18, 2019

The Infection Control Branch of CHP organised a two-day "Symposium on Prevention of Healthcare-associated Infections in Hospitals and Community Institutions" on January 17 to 18, 2019, preceded by half-day hospital visits for overseas and local experts on January 16, 2019.

The symposium aimed to promulgate the recently updated recommendations issued by the Scientific Committee on Infection Control on the prevention of healthcare-associated infections (HAIs). The symposium was composed of four sessions, each focusing on a major HAI, namely, catheter-associated urinary tract infection, surgical site infection, catheter-associated bloodstream infection, and ventilator-associated pneumonia.

Four overseas experts in infection prevention, Professor Anucha Apisarnthanarak, MD, from Thammasat University Hospital, Thailand; Professor Trish M. Perl, MD, University of Texas Southwestern Medical Center, USA; Dr William R. Jarvis, MD, Jason and Jarvis Associates, Limited Liability Corporation, USA; and Dr Michael Klompas, MD, Brigham and Women's Hospital, USA, have been external reviewers of the four recommendations. The overseas speakers provided valuable insight in the prevention and surveillance of HAIs, global and regional situation, the threat of MDROs and future development of prevention strategy.

In addition, local experts provided local perspectives by elaborating on the evidence base and rationales of changes in the recommendations, presented survey results of local practice, and gave an overview of the local surveillance situation.

All presentation materials have been uploaded onto the Hong Kong Training Portal on Infection Control and Infectious Diseases: http://icidportal.ha.org.hk/Trainings/View/139.