

INFECTIOUS DISEASES: OLD AND EMERGING

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In this issue of the Singapore Family Physician, the skills course covers three conditions caused by viruses, namely chronic hepatitis B, cervical cancer, and rotavirus gastroenteritis. There is also an advisory on DF/DHF primary care management. Hepatitis B is now controlled by vaccination. Hopefully, the HPV vaccine and the Rotavirus vaccine could also play a role in controlling the respective diseases.

In a keynote address delivered in the Asia Pacific Regional WONCA conference in Kyoto Japan in May 2005, Dr Shigeru Omi, the Regional Director Western Pacific, World Health organization, mentioned that the social forces such as urbanizations, advances in technology and an aging population have changed the disease patterns of the world¹. In 1990, traditionally important diseases such as infectious diseases and causes of maternal mortality accounted for about 70% of the disease burden. In the year 2020, non-communicable disease such as lifestyle related disease, cancer psychiatric and mental health problems will account for 70% of the disease burden.

Will communicable disease disappear all together? Unlikely. In recent times the world have been ravaged by zoonoses, such as the avian flu and SARS. In the years to come new infectious diseases will undoubtedly emerge, and old diseases such as dengue will continue to rear their heads until we succeed in controlling them.

Dengue fever/Dengue Haemorrhagic Fever

For the past few years Singapore has seen a resurgence of dengue. The mosquitoes are becoming more resistant to commonly used antibiotics and pesticides. They are able to survive in adverse environments. More complete elimination of the breeding places of the Aedes like small containers, empty coconut husks, old discarded tyres, water tanks, and drains by keeping them dry is necessary to deprive the mosquito of its breeding sites. If these cannot be kept dry, adding salt will be one way of making the water in them unsuitable for the mosquito.

Hepatitis B

Hepatitis B is a double stranded DNA virus that is transmitted parentally, sexually and by intravenous drug use. In Asia, vertical transmission perinatally is the most important mode of transmission. Once infected, 90% of babies will develop chronic hepatitis B. They are usually asymptomatic till later in life.

Newly affected adults are icteric with 1% progressing to fulminant hepatitis. The majority will recover with the development of HBs antibodies and HBc antibodies. Only 1-3% of adult acquired infection progress to chronic HBV infection. Due to host immunity response, many HBV mutant strains have emerged in patients with chronic HBV infection.

Basically there are 2 broad categories of chronic hepatitis B virus infection, the inactive carrier and chronic hepatitis B³. The former is positive for HBV surface antigen (HBs Ag), has normal aminotransferase levels, has little or no necroinflammatory hepatitis activity and has relatively low serum HBV DNA. The latter is HBs Ag positive, has elevated aminotransferase levels, significant necroinflammatory activity, high serum HBV DNA and is HBe Antigen positive. Genetic mutation in the viral DNA genome of the virus has also increased the prevalence of HBe antigen negative chronic hepatitis.

It is important to identify and treat patients with chronic active hepatitis. This is to decrease the disease burden on the society, individual and family. Thirty years after the infection many individuals will develop liver cirrhosis resulting in death unless a liver transplant is available. Many will also succumb to Hepatocellular Carcinoma.

A safe and effective recombinant vaccine against HBV is available. In Singapore, a comprehensive vaccination program available has reduced the prevalence rate of HBV infection from 8% to 4%. In a recent survey conducted by James L, Fong CW et al in 1999 practically all school children are immune to Hepatitis B².

Human Papilloma Virus (HPV)

HPV is a non-lipid enclosed virus with a double stranded DNA genome. Clinical manifestations of HPV infection include genital warts, cervical, vaginal, vulval, and anogenital intraepithelial neoplasm, anogenital squamous carcinoma and rare serious condition called recurrent laryngeal papillomatosis found in infants born to infected mothers. There are many subtypes of HPV, those that are associated with high-grade cervical changes and cervical cancers are Types 16,18,31,33 and 45. Malignant cervical lesions are frequently associated with HPV 16 and 18.

HPV must enter and infect the basal epithelium in order to establish infection. The most common sites are areas of micro and macroabrasions where the skin splits during sexual activity. These are the perineum, posterior fourchette and the perihymenal area in women; urethral glands and shaft of the penis in men. Epithelia that are naturally thin and immature such as the transformation zone of the cervix or the anal verge

are areas of greater risk. The incubation period of the virus varies from 3 weeks to 8 months.

Treatment of clinical HPV infection is difficult and it recurs after treatment. The ideal approach is to prevent infection with the prophylactic use of HPV vaccine. Vaccine has the potential to decrease the incidence of cervical cancer, precursor lesions and elimination of genital warts. The only problem is that HPV produce type specific immunity. Each HPV produce a neutralizing antibody only effective to that type. The current vaccines involve virus-like particles that are nontoxic and very immunogenic. Trials are now underway to determine the effectiveness of such vaccine. So far it has been shown to be effective in reducing the incidence of persistent HPV infection and are well tolerated.

Rotavirus

By the time the child is 5 years old, he or she would have been infected by the Rotavirus. It is the leading cause of acute gastroenteritis and may be fatal in severe cases. The infection may occur at any age but serious symptoms occur almost in children age 3 to 24 months old. The infection usually leads to an acute self-limiting diarrhoeal illness. Death results from dehydration and electrolytes imbalance. The virus is highly contagious and outbreaks are difficult to control. The virus can survive for days on environmental surfaces and for months in stools at ambient room temperatures. Transmission is by fecal oral route and commonly from person to person. Transmission via toys and countertops has been demonstrated. Besides children, rotavirus also can affect adults.

No specific therapies are available for rotavirus gastroenteritis. Treatment is supportive through prevention of dehydration and electrolytes imbalance through fluid replacement by oral rehydration fluid and intravenous fluids as appropriate. However, children who survive a first infection develop systemic and local immunity that prevents and forestalls subsequent symptoms from rotavirus infection. Vaccination is the only plausible means to reduce the associated morbidity and mortality.

The first rotavirus vaccine, ROTASHIELD was licensed for use in the United States on August 1998. However, it was withdrawn in July 1999 after 15 cases of intussusceptions were reported after the vaccine administration. Because of huge burden of rotavirus infection, the withdrawal of Rotashield prompted the manufacturer to look for an alternative vaccine. Currently, the GlaxoSmithkline vaccine, ROTARIX is undergoing multicenter trials in Singapore. So far the results are promising with only mild side effects and no reported cases of intussusception.

REFERENCES

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3. Lok AS, McMahon BJ: Chronic Hepatitis B: update of recommendations. AASLD Practice Guidelines. Hepatology 39:857, 2004 (PMID 14999707).