CHANDNI PATEL

HEPATITIS

Describe the pattern of disease in those infected with hepatitis B population in Singapore, and discuss this in the context of global health.

The most common cause of chronic liver disease in Singapore is viral. Roughly 15-40% of infected individuals develop liver cirrhosis, failure or hepatocellular carcinoma[1]. Figure 1 shows that there are intermediate levels of infection in Singapore. 4-6% of the population are carriers of chronic hepatitis B; the Chinese population have the highest rate of incidence, and more males are surface antigen positive[1]. The majority of people are infected in childhood, through either mother-to-child or child-to-child transmission[2].

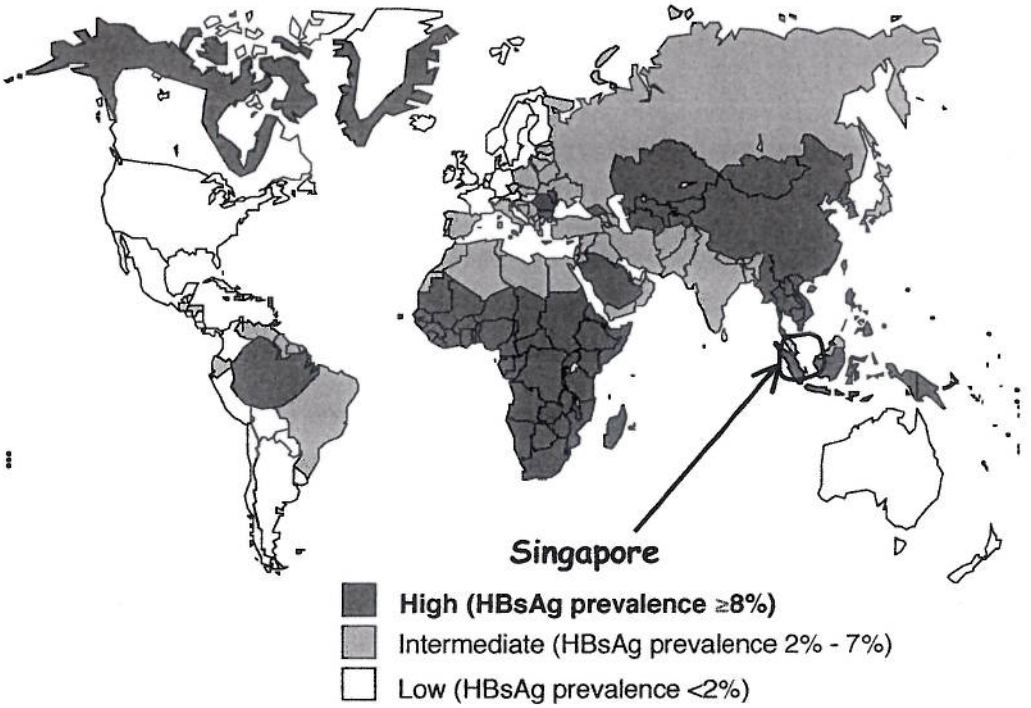

Figure 1 – Geographical distribution of hepatitis B, adapted from http://www.who.int/vaccines-documents/DocsPDF01/www613.pdf

20% of the chronic carriers have been estimated to be cirrhotic; with the ratio of compensated to decompensated cirrhosis thought to be 8.25:1[1]. Studies have suggested that the financial burden of hepatitis B increases with severity, therefore the statistics mentioned suggest that there is a large financial burden associated with hepatitis B and its related complications in Singapore[3].

Singapore was in the first group of countries to introduce mass immunisation against hepatitis B[4]. In 1985 they introduced vaccination of all babies born to surface antigen positive mothers, and then in 1987 this programme was broadened to include all new born babies, regardless of the mothers surface antigen status[4].

Immunisation Schedule

Vaccine	BCG	Hepatitis B	DTP/Polio	DTaP/Polio/HiB	DTaP/Polio/HiB/ Hepatitis B	Pneumococcal	Rotavirus	Influenza	Varicella	MMR
Immunisation against	Tuberculosis	Hepatitis B	Diphtheria, Tetanus, Pertussis, Polio	Diphtheria, Tetanus, Pertussis, Polio, H influenza B	Diphtheria, Tetanus, Pertussis, Polio, H influenza B, Hepatitis B	Strep pneumoniae	Rotavirus	Influenza	Chicken pox	Measles, Mumps, Rubella
Birth	✓	✓								
1 month		✓								
6 week					✓					
2 month						✓*	✓			
3 month			✓	✓	✓					
4 month			✓	✓		✓*				
5 month			✓	✓	✓					
6 month		✓				✓*	✓			
1 year										
15 month						✓'				✓
18 month			✓	✓	✓ (DTP/Polio/HiB)			✓ (From 6mths)	✓ (From 1yr)	
6 year			✓ (DT/Polio)	✓ (DT/Polio)	✓ (DT/Polio)					
12 year			✓ (DT/Polio)	✓ (DT/Polio)	✓ (DT/Polio)					✓

Pneumococcal vaccine: *Dosing interval is 4 – 8 weeks with 'booster at least 2 months after 3rd dose
7 – 11 months (3 doses), 12 – 23 months (2 doses), 24 months – 9 years (1 dose)

Figure 2- Singapore's immunisation schedule taken from http://www.sgh.com.sg/Clinical-Departments-Centers/Neonatal-Developmental-Medicine/Documents/VaccinForInfantChild06v8.pdf

Since the introduction of the vaccine, incidence of hepatitis B has declined, as has the incidence of liver cancer in men[4]. Booster doses are not routinely offered in Singapore, and according to the World Health Organisation (WHO) these are not essential as it is thought immunity lasts for 15 years[5]. In Singapore as infection is more common in childhood, this protection is adequate.

Even though the introduction of the vaccination has lead to a decline in incidence of hepatitis B, new incidences are still being reported. Other factors need to be considered such as improving public awareness of transmission. A study has shown Singaporean public awareness of hepatitis B to be good, however there are some misconceptions[6]. Public awareness is also related to level of education. Those who are better educated have better awareness[6]. The main misconception has been found to be in mode of transmission. Many people believe that transmission is by sharing food and eating seafood, and only 52% of people included in the study were aware of vertical transmission[6]. To see a further decline in hepatitis B incidence, targeting information at the less educated is essential, as are campaigns to make people aware of transmission. Improving knowledge of transmission is crucial in preventing spread of infection, especially during birth.

Describe the pattern of health provision in Singapore and contrast this with the UK.

The World Health Organisation (WHO) in 2000 released a report looking at health systems around the world and it ranked Singapore 6th out of the 191 member states. The United Kingdom came 18th[7]. Similarly, in 2010 World Health statistics showed that the probability of dying by aged 5 per 1000 live births was 3 for Singapore and 6 for the United Kingdom; the leading cause for these deaths was congenital abnormalities in Singapore and prematurity in the United Kingdom[8]. In both countries these figures had been consistent since

1990. According to the same statistics in 2007 the healthy life expectancy in Singapore was 73 years and 72 years for the United Kingdom[8].

The reason these figures are astonishing is that, in terms of physicians per 10,000 population, Singapore has fewer physicians than the United Kingdom, 15 compared to 21 respectively, yet it maintains the same life expectancy and according to WHO a considerably better health system[8].

Singapore's health system composes of 3 tiers. The first is finance provided by the government. All Singaporeans are entitled to have up to 80% of their bills paid by the government. This is for all acute, public ward admissions. To pay the outstanding amount, they need to use 'Medisave', which brings us onto the second tier. Medisave is a compulsory savings account for medical fees. Everyone who is working contributes to this, as does his or her employer. Depending on the age group 7-9.5% of the monthly salary contributes to Medisave. This sum of money is accessible for a number of medical services and in retirement, it is also available to the person's dependents. In December 2010 it was said that the average person would have enough in their fund for 9-10 acute hospitalisations[9]. The final tier, allows Singaporeans to contribute towards medical insurance for major medical expenses where Medisave may not be enough. These premiums can be paid either by cash or using the persons Medisave fund. Medishield is only one of those offered, there are many private insurances available in addition[9]. For those who are unable to afford their healthcare still, the government has Medifund. Medifund is said to give greater help to those who have made regular contributions to Medisave or Medishield, however still face challenge[10].

The medical savings fund can be used for private healthcare as long as the hospital accepts Medisave claim payments. Patients are encouraged to choose a form of healthcare they can afford, keeping mind future medical costs.

It can also be used for some chronic diseases. For each encounter the patient would need to pay $30 plus 15% of the total bill, and Medisave would pay the remaining cost.

There are restrictions for when Medisave can be used and for how much can be withdrawn. One of these is that unless the person is having day surgery or they have died, they must have been in hospital for a minimum of 8 hours[9].

This system is very different from the National Health Service (NHS) which was set up in 1948, more than 30 years before the Singaporean health system. The NHS remains free to all residents in the UK. Prescriptions, dental and optical care are exempt from this. Unlike Singapore's system in medical care, patients do not have to pay anything when treated and there is no limit on the number of hospitalisation. Both primary and secondary care are covered. In general a person who is earning over a given amount will pay 12% national insurance, this is not only taxation for healthcare, but also for pensions, benefits when unemployed and allowances at times of bereavement. Those on high salaries will pay 2% more[11]. The NHS however, gives room to be abused by the public, as there are no restrictions or costs for medical admissions, the public are able to waste resources by unnecessarily seeking medical advice/treatment. On the

other side it does mean people do not have to worry about cost when considering going to hospital, therefore are more likely to present to a clinician earlier in illness, rather than waiting to see if symptoms resolve to avoid medical costs, which in certain cases can be life threatening. For patients with chronic disease the NHS does not charge for management. This can become very expensive for patients using the Singaporean system, especially if their disease is not well controlled and therefore require more appointments and medication. For this reason the Singaporean system may not seem fair to some people.

How is hepatitis B managed in Singapore?

Figure 3 summarises the management of the various hepatitis B statuses according to the Asian Pacific guidelines[12]. In addition regular monitoring of patients HBV DNA is necessary and if possible patients should be tested for drug resistance. Both these factors contribute to cost effective treatment[12].

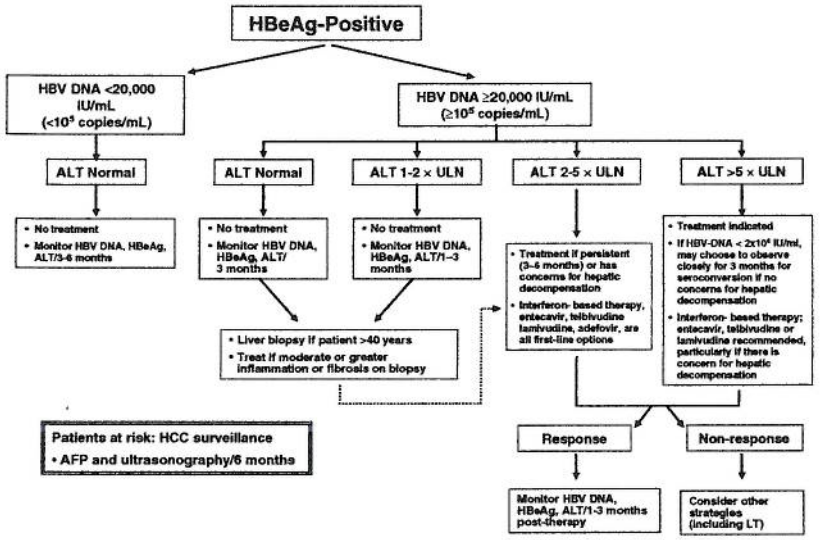

Fig. 1 Algorithm for the management of hepatitis B e antigen (HBeAg)-positive patients with chronic hepatitis B infection. AFP: alphafetoprotein; ALT: alanine aminotransferase; HBV: hepatitis B virus; HCC: hepatocellular carcinoma; ULN: upper limit of normal; LT: liver transplantation

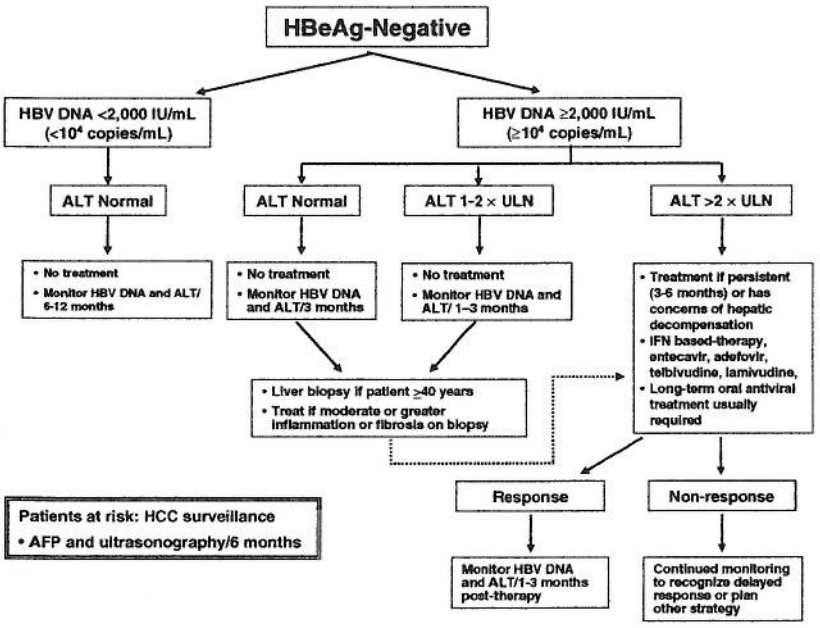

Fig. 2 Algorithm for the management of hepatitis B e antigen (HBeAg)-negative patients with chronic hepatitis B infection. AFP: alphafetoprotein; ALT: alanine aminotransferase; HBV: hepatitis B virus; HCC: hepatocellular carcinoma; ULN: upper limit of normal

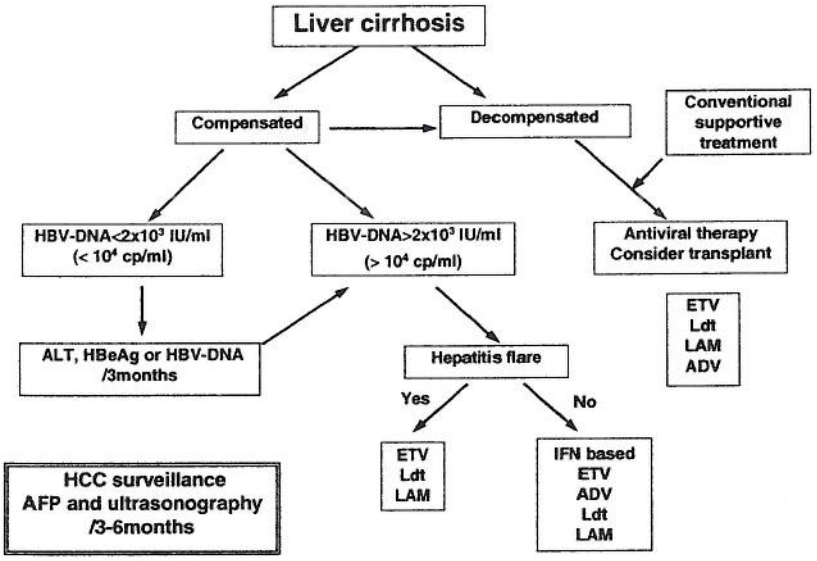

Fig. 3 Algorithm for the management of chronic hepatitis B infection with liver cirrhosis. ADV: adefovir; AFP: alphafetoprotein; ALT: alanine aminotransferase; ETV: entecavir; HBeAg: hepatitis B e antigen; HBV: hepatitis B virus; HCC: hepatocellular carcinoma; IFN: interferon; LAM: lamivudine; Ldt: telbivudine

Figure 3 - taken from Asian-Pacific consensus statement on the management of chronic hepatitis B: a 2008 update

One study looked at whether practitioners in Asia Pacific countries were adhering to the Asian Pacific consensus[13]. One of the main findings was that clinicians when surveyed thought viral DNA was more important the ALT when initiating treatment[13]. It is shown by figure 3 that treatment should not be offered to patients with ALT levels less than twice the normal limit. An exception is in cases of advanced fibrosis or cirrhosis. This shows possible discrepancies between the recommended guidelines and clinical practice. Figure 3 also shows that where treatment is indicated there is no preference in approved first line therapy. However the study found that 62% of respondents used oral anti-viral's for their patients and only 15% used Interferon therapy[13]. This indicates a possible preference for oral anti-viral's.

Reflect on your experience in the lab, commenting on activities. How will this experience effect your professional development?

My time in the lab has been an invaluable experience. In the short time I have learnt to use the flow cytometer and to stain cells in preparation. In addition gaining some experience in understanding and using functions for compensation. The latter is probably something that took the longest for me to understand.

I was able to assist with processing blood a technique that I will take back to the UK, to hopefully ensure higher yields of cells from future blood samples. The tips I have gained for this process will be very useful.

Overall the techniques learnt, and improved in the lab in Singapore will be very beneficial in the career of academic medicine I hope to pursue.

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