**Immunology Clinical Problems**

1. A boy was born after an uneventful pregnancy and weighed 3.1kg. At 3 months, he developed otitis media and an upper respiratory tract infection. At the ages of 5 months and 11 months, he was admitted to hospital with Haemophilus influenzae pneumonia. At the age of 18 months he was admitted with atelectasis (collapse of part of lung) and cough. Family history revealed that this boy had a 4 years old brother who suffered from repeated attacks of pneumonia.

Examination showed a pale, thin child whose height and weight were below the expected normal for his age. There were no tonsils in his throat and he never had surgical removal of the tonsils. There were no other abnormal features. He had been fully immunized as an infant (at 2, 3 and 4 months) with tetanus and diphtheria toxoids, whole-cell pertussis, Haemophilus conjugate vaccine and oral polio. In addition he had received measles, mumps and rubella vaccine at 12 months. All immunizations were uneventful.

**Immunological investigations**

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| *Quantitative serum immunoglobulins (g/l)* | | |
| IgG | 0.17 | [5.5-10.0] |
| IgA | Not detected | [0.3-0.8] |
| IgM | 0.07 | [0.4-1.8] |
| *Antibody activity* | | |
| Immunization responses | | |
| Tetanus toxoid - no detectable IgG antibodies | | |
| Diphtheria toxoid - no detectable IgG antibodies | | |
| Polio - no IgG antibodies detected | | |
| Measles - no IgG antibodies detected | | |
| Rubella - no IgG antibodies detected | | |
| Isohaemagglutinins (IgM) not detected (blood group A Rh+) | | |
| *Blood lymphocyte subpopulations (x109/l)* | | |
| Total lymphocyte count | 3.5 | [2.5-5.0] |
| T lymphocytes (CD3) | 3.02 | [1.5-3.0] |
| B lymphocytes (CD23) | <0.03 | [0.1-0.4] |
| (CD19) | <0.1 | [0.3-1.0] |
| (CD20) | <0.1 | [0.3-1.0] |

\*Normal range for age 18 months shown in brackets.

Q. No. 1 What is the diagnosis

Q. No. 2 What is the mode of inheritance of the disease

Q. No. 3 What test can be performed to check the T cell function in this patient

Q. No. 4 Why was Peter well for the first three months after birth?

Q. No. 5 Can this child be vaccinated with live viral vaccine?

Q. No. 6 What is the cause of absent tonsils.

Q. No. 7 What is the treatment for this disorder?

2. A 69-year-old woman was fit and well until one August when she was stung on the back of her right hand by a wasp. She had previously been stung on several occasions, the last time 2 weeks earlier. Within 5min, she felt faint, followed shortly by a pounding sensation in her head and tightness of her chest. She collapsed and lost consciousness and, according to her husband, became grey and made gasping sounds. After 2-3min, she regained awareness but lost consciousness immediately when her husband and a friend tried to help her to her feet. Fortunately, a doctor neighbour arrived in time to prevent her being propped up in a chair: he laid her flat, administered intramuscular epinephrine (adrenaline) and intravenous antihistamines and ordered an ambulance. She had recovered fully by the next day.

Q. No. 1 What is the diagnosis?

Q. No. 2 Which type of hypersensitivity reaction was the cause of her condition?

Q. No. 3 What investigation is indicated?

Q. No. 4 What precautions she must take for the future?

Q. No. 5 What is the treatment of the condition?

3. A 21-year-old woman was referred to a neurology clinic with a 1-month history of double vision, difficulty swallowing and weakness in her upper arms. These symptoms were mild or absent in the morning and tended to worsen through the day. When she was seen towards the end of an afternoon neurology clinic she was found to have a bilateral ptosis and disconjugate eye movements that could not be ascribed to any individual cranial nerve lesion. Her upper limb power was initially normal but deteriorated with repeated testing. She was diagnosed as a case of Myasthenia gravis.

Q. No. 1 How can the diagnosis be confirmed?

Q. No. 2 What is the site of lesion?

Q. No. 3 What type of hypersensitivity reaction is the cause of her condition?

Q. No. 4 If this patient gets pregnant is there any threat to the new born baby?

Q. No. 5 What is the treatment of this condition?

4. An 18-year-old student with end-stage renal failure due to chronic glomerulonephritis was given a cadaveric kidney transplant. He had been on maintenance haemodialysis for 2 months, and on antihypertensive therapy for several years. His major blood group was A and his tissue type was HLA-A1, -A9, -B8, -B40, -Cw1, -Cw3, -DR3, -DR7. The donor kidney was also blood group A and was matched for one DR antigen and four of six ABC antigens. On the seventh postoperative day, his graft became slightly tender and he had a mild pyrexia (37.8°C).

Q. No. 1 What complication may have occurred?

Q. No. 2 How the diagnosis can be confirmed?

Q. No. 3 What tests are indicated to monitor the course of events?

Q. No. 4 Comment on the tissue matching between the donor and the recipient?

Q. No. 5 What is the treatment of the condition?

5. A 27 year old man noticed that for the last two months he developed nasal symptoms every time he would play football on green grassy field. The symptoms occurred in a very short time and included sever sneezing, itching in the nose and eyes and runny nose. Occasionally he also felt tightness and difficulty in breathing. He consulted his physician who prescribed some treatment and advised some laboratory investigations to establish the diagnosis

Q. No. 1. What type of immunological reaction underlie this condition?

Q. No. 2. Explain the basis of this reaction and how does the underlying pathology match with the presenting symptoms

Q. No. 3. What type of laboratory test was requested

Q. No. 4. Give one reason which may cause the test to show a false negative result.

Q. No. 5. What alternative test would you suggest for patients who show false negative results?