

Medi-Vision™ Film Transcript

Programme 39
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CHILDHOOD EXANTHEMS: MEASLES, CHICKENPOX & SCARLET FEVER

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Introduction

DCA The exanthems are infectious diseases that present with erythematous maculopapular rashes, most commonly in childhood. Every health care worker should be able to recognize the common ones and appreciate the importance of immunisation where relevant, in their prevention. On this film we consider two, Measles and Chickenpox that are caused by viruses; and one, Scarlet fever, which is caused by a bacterial toxin. The issue of streptococcal skin diseases generally is then discussed along with the potentially fatal condition of meningococcal septicaemia.

Through watching this film you should

- Appreciate their distinctive skin rashes and understand the aetiology, transmission, pathophysiology, diagnosis and management of these diseases
- Know about its complications and the importance of high mortality of measles in the Developing World
- Recognise Be aware of immunisations protocols for measles and be an informed advocate for the live attenuated MMR triple vaccine, and where relevant the measles component alone
- Understand the link between Varicella and Herpes Zoster
- Appreciate the possible complications of Varicella, the risks of the disease in specific groups, and the arguments surrounding immunisation, Varicella immune globulin, and anti-viral drugs.
- Understand the vital importance of immediate antibiotics in any ill person with either a streptococcal rash, or a non-blanching purpuric rash
- And finally appreciate the issues surrounding immunisation against some, but not all, of the different strains of meningococcus.

Measles (Morbilli)

DCA Most of the patients shown on this programme were filmed in San Lazaro Hospital, Manila, but we start with an introduction to Measles with Dr Paul Heath of St George's Hospital London.

DCA Paul, measles is one of the classical exanthems, and on this film we are going to see a number of cases in a moment. What are the main clinical features to look out for?

PTH The main clinical feature is the rash, and it's a characteristic, brick red in colour, and generally begins on the face, often behind the ears, and then progresses over the trunk. Initially discrete lesions, which sometimes become confluent. Before the rash occurs, however, there are also some characteristic features and they are fever, conjunctivitis, coryza (ie a cold), and cough. And then the pathognomonic feature is Koplik's spots, which are present just before the rash begins and then for one or two days after the rash starts. And these are small, greyish-white lesions on the buccal mucosa with an erythematous background

DCA It's highly infectious, do we know why that is?

PTH I don't think we do. I mean it's infectious because the virus is excreted from the saliva for example. It's also excreted from other secretions, such as urine, and in large amounts. It's mode of transmission is airborne spread- droplets- from person to person. And we know it to be very infectious, as evidenced by the numbers of cases that will occur, for example in a household. If there are others in the house who have not previously had measles, one would expect them all to be very likely to get measles. And we can't really say that about other infections.

DCA What's the incubation period for measles?

PTH The incubation period is between ten and fourteen days

DCA And what are the main complications?

PTH The minor complications include things like ear infections. Pneumonia is one of the more important complications, and that is more associated with older individuals, but that can be very severe. And that can be a measles virus pneumonia. It can also be a secondary bacterial pneumonia. A range of other complications includes such things as encephalitis, and then a late form of encephalitis- so called subacute sclerosing panencephalitis (SSPE), which occurs some years afterwards..

DCA But which has a relatively low incidence

PTH Relatively low, but uniformly fatal

Patient 1, 4 yrs

NJ Measles is an acute viral disease is characterised by fever, coryza, conjunctivitis and specific enanthem called Koplik's spots and a maculopapular rash. From zero to ten years old there is a peak incidence of measles.

Right now we have a four year old case of measles who came in with fever, cough and conjunctivitis. The conjunctivitis here is very prominent.

This is only three days duration of illness; the patient was admitted yesterday.

This is the morbilliform rash which is very different from Varicella.

Whereas Varicella starts from the trunk, in measles it is the hairline that is usually affected and the rash then goes downwards.

Right now the patient has no lesions yet on the lower extremities.

This is only the face and the upper extremities.

This is very itchy....

The patient is on penicillin sodium plus antipyretics, and if there are any wheezes we give bronchodilators. If it is indicated we give IV fluids.
But the main management is antibiotics plus antipyretics.

NJ Usually the peak season for measles here in the Philippines is from January to April. Right now we are in January so we have 95 cases of measles here in San Lazaro Hospital right now, 75% of which are paediatric cases and 25% of which are adult cases.

Patient 2 3 yrs

NJ This patient has brawny desquamation... the patient is sleeping quietly. Here are the lesions with brawny desquamation; but the patient is still here because of pneumonia.

Patient 3 14 months

NJ This patient was admitted yesterday due to fever, cough and this kind of croup. So this case is already a post-measles case but it was admitted here in our Pavilion because the maculopapular rash of measles is still fresh on the extremities. But here it is already desquamated. But in the lower portion it is still very fresh.... This is a laryngo-tracheitis, a very common complication of measles for which we give antibiotics such as oxacillin in this case. And we have had this patient examined for a nose and throat culture because the patient might have symptoms of diphtheria, namely hoarseness.

Patient 4 6 mths

NJ This is a 6 month old baby with a maculo-papular rash here... this area in the face... with oculo-nasal catarrh ... but not so much. This is a malnourished child... measles is very common in malnourished children. So nutrition counts for a lot in infectious diseases.

Patient 5 18 yrs

NJ This is a case of an 18 year old male who is newly admitted in our Pavilion due to fever, cough, muscle and joint pains; who had been sick for about a week and then the maculo-papular rashes appeared at three days prior to admission. The patient has a maculo-papular rash on the face plus conjunctivitis. And he has this very pathognomonic enanthem of measles which is the Koplik's spots.... these are multiple white spots on a red background. This is very pathognomonic of measles.

Patient 6 11 mths

CD This is an 11-month old male patient, Raphael, who came in with five days fever, conjunctivitis, alar flaring and no diarrhoea. He was started on co-amoksiclav, and the diagnosis was measles with pneumonia. So we admitted him based on that initial impression, continued the co-amoksiclav, started nebulisation, and started him on vitamin A100.000 Units daily for two days only, to aid in the desquamation. Right now he is on his sixth hospital day. We changed his antibiotic to chloramphenicol because of persistent low grade fever, but his CBC was normal. Desquamation as you can see is more prominent than usual. We attribute this to local practices rubbing on 'Cilantro' – that is a herbal medication that they believe

could help. But of course it doesn't. When baby Raphael came in his rash was not the usual maculopapular rash of measles. The rash was raised, but darkened. And from there it started to desquamate. He is still a bit tachypnoeic and on auscultation we can still hear crackles in both bases. The rash on the feet is more typical of late phase measles.

Patient 7 8 mths

She came in also with a maculopapular rash, fever and difficulty in breathing, so we admitted her to our ICU (Intensive Care Unit). As you can see the rash is typical of measles – maculopapular, erythematous and slightly raised, and all over her body. When she came in they noticed the beginnings of conjunctivitis. The conjunctivae are still slightly swollen, but not as purulent as usual. She is being given oxacillin and gentamycin. So treatment is usually supportive because measles is viral, but with the usual complications of pneumonia.

Measles Discussion

DCA Now on this film we've seen children and some adults with measles in Asia. Would you like to say something about the problems specific to the developing world, in regard to measles?

PTH Yes, well it's a huge problem in the developing world. Of course in large part that's because measles vaccine is not being widely used. The other important reason is that many individuals will be malnourished, and malnutrition is well known to predispose toward severe measles infections.

DCA So in developing countries the mortality may be much higher?

PTH Yes, indeed. And pneumonia may be an important reason for that.

DCA What is the measles virus?

PTH It's an RNA virus of the paramyxovirus family, related to other common viruses like parainfluenza virus for example

DCA I think the film illustrates the severity of the disease. What is the situation regarding immunisation against measles?

PTH Well we have a very effective vaccine against measles which in the United Kingdom and other industrialised countries is usually given as part of the measles/mumps/rubella (MMR) vaccine. This is a live attenuated vaccine which is very immunogenic and very effective. In the UK and indeed in most other industrialised countries it's usually given as two doses. The first dose given in the second year of life, for example in the UK between 12 and 15 months of age, and then the second dose some time after. In the UK the second dose is often given at 3 to 4 years, although sometimes it's given earlier, particularly in the setting of an epidemic of measles.

DCA And does that produce life-long immunity.

PTH It certainly gives long-lasting immunity. It is possible that individuals vaccinated at that young age, by the time they reach adulthood may have less or no immunity. That hasn't become a clinical problem at least, but it is still in a sense relatively early to see that, as those individuals were vaccinated perhaps 20 years ago.

DCA So what complications do you see that are clearly attributable to the vaccines?

PTH In about 5 to 15 percent of children we see the manifestations of the attenuated measles virus infection, and that occurs one to three weeks after the vaccination, and typically consists of a low-grade fever and a rash. It's also possible, though much less common to see features of the live attenuated mumps or rubella

infections, with for example parotitis, but that is much less frequent and would be less than one percent.

DCA And the safety of the vaccines?

PTH The only group in which one shouldn't give the vaccine because it is live attenuated would be immuno-suppressed patients, because there clearly it has the potential to cause more severe infection. Otherwise the safety record is excellent, with many millions of doses now given world-wide. There has been recent controversy in the United Kingdom particularly, about a possible relationship between MMR and autism and bowel disease. But I think there are now sufficient numbers of good quality studies which show no relationship between those two, such that we do not believe that to be an issue, and all countries using MMR continue to recommend the use of this vaccine.

DCA Now in developing countries, is it or should it be used in the same way?

PTH I think in developing countries it would be unlikely that MMR would be the vaccine being used. It is likely to be the single measles vaccine that is being used as part of the EPI schedule, for example. And it is often given earlier – for example at nine months of age because measles is more endemic, and therefore one wants to try and achieve protection earlier. Otherwise the vaccine is similar to the measles component of the MMR that is used

DCA Some of the children seen on this film were actually much younger than that. Is there an age below which you shouldn't give measles vaccine?

PTH Well it's governed by maternal immunity. It is maternal immunity that seems to interfere with the response of the infant to the measles vaccine, in that if there is maternal immunity present they are much less likely to respond to the vaccine. So that is why nine months is more frequently used. It may be that it could be used at a lower age than that, and some countries have used it down to as low as six months, but at less than that it is unlikely to work. That may change in time as parents, particularly mothers become dependent on protection through vaccination themselves as opposed to a natural infection they had when they were children. So it may be that their immunity doesn't last as long, and therefore for their infants we could potentially vaccinate them earlier than that age, but that is the subject of on-going research

Chickenpox (Varicella)

DCA We now turn to Chickenpox or Varicella, and I start by asking Dr Heath to explain the main differences between Measles and Chickenpox.....

PTH The rash is the main difference between the two. The rash of chickenpox is a pleomorphic rash – that is there are a number of different stages of the rash. So for example when one is examining a child with chickenpox, many different stages will be present at the one time. The rash typically begins with papules, becoming vesicles, pustules, and then crusting, and it's those characteristic stages and the presence of all stages at the one time that is pathognomonic of chickenpox. Chickenpox usually has no prodrome – that is there are no particular symptoms before the rash comes out.

DCA And chickenpox is caused by a DNA virus.

PTH That's right, a herpes virus – of the herpes family

DCA And what about the incubation period of the two diseases?

PTH The incubation period is similar in fact – 10 to 14 days for measles, and 14 to 21 days for chickenpox.

Patient 1 7 mths

NJ This is the case of a seven month old baby with chief complaints of fever and cough of three days duration prior to admission.
And then on the day prior to admission there was a rash noted by the mother at this site.... which is a vesiculo-pustular lesion or the “mother” lesion since this is the first crop to arise.

And then around it... some sort of a macular rash... this might be prickly heat.... prickly heat or it might be a combination with measles. So the lesions of Varicella are usually on the trunk or on the back.
And now there is another crop that arises here... this one... which is really vesicular in nature...

Patient 2 7 months

NJ This is a seven month old baby girl with chief complaints of fever and cough prior to admission.

And this time this patient vomited so the mother was so adamant that the patient should be admitted.

And then a day prior to admission the patient had a vesicular rash; the patient is already on the fifth hospital day, and they are all encrusting.

Here these are all crusted already and are all dried up.

The patient is just on oral amoxicillin; she has simple pneumonia, because there is no chest indrawing, no fast respiration. With paediatric cases they are not sick-looking.

Mongolian blue spots are very common in Philippino babies.

There is no pathological significance to these.

Patient 3 11yrs

NJ This is another case of Varicella, an 11 year old female with chief complaints as always of fever and cough. The patient had it five days prior to admission.

So when we got the patient it was already at the crusting stage.

This is on the sixth day of the rash.

So the patient was admitted because of a complication of pneumonia... severe in this case.

She had also a complication of conjunctivitis; Varicella and measles usually have conjunctivitis. And sometimes they do have oral thrush, but in this case we don't have any, but the patient had some sort of blisters here because of the high temperature.

Because before the rash has appeared the patient is always complaining of an on and off fever, high grade in character.

Usually they are dehydrated here.... on the lips, that is why the patients sometimes have oral thrush.

This is the first lesion of Varicella... and then it spreads here at the trunk going to the extremities and later on the face.

So the patient has it here, with pustules.

So these eruptions are infected secondarily, so the patient was started on penicillin and then later on she was on oxacillin because of the kind of lesions that we have... they are pustular.

Patient 4 16 yrs

NJ This is another patient with Varicella, a 16 year old male who was admitted three days ago.
He had fever, cough, muscle and joint pains a week prior to admission.
On admission the patient has vesicular rashes, but this time it is different because it is somewhat pinpoint in character.
This patient had his first lesion on the buttocks.
Varicella especially in adults is somewhat extensive and more difficult because they have complications usually of pneumonia.
Because in adults they don't pay attention to their sickness; they will just take antipyretics.
Usually the complications in adult cases are the secondary bacterial infection of the lesions, because usually in adults these are very itchy, and they tend to scratch them.
The proximal part is much affected rather than the extremities.

Patient 5 17 yrs

NJ This is a case of a 17 year old male who has been here with us for about a week now. Two weeks prior to admission he had fever, cough and with eruptions already like these vesicular lesions, which started here, where it is very black already.... this one, and then moving downwards, then on the face and then the extremities.

So Varicella in adults is much more extensive than in children.
The face is already crusting up... he is still with vesicular lesions on the extremities.
And the other symptom that the patient has is usually itchiness all over.
The patient is suffering from severe pneumonia with secondary bacterial infection.

Patient 6 18 yrs

NJ This is the case of an 18 year old female who has been sick for three weeks already now, but has only stayed here for a week.
So prior to admission the girl was sick with fever, cough, muscle and joint pains, and she is complaining of chest and back pain.
So on admission she already had pneumonia two weeks prior to admission.
And this lesion, ... the reddish one... these are fresh lesions but it already burst.
These are already old but haemorrhagic in nature and already crusted.
Then look at the legs here... the lesions are very extensive, haemorrhagic, complicated... with secondary bacterial infection already.
The other parts here... are already drying up but the rash still haemorrhagic.

N This is already a three week old illness and maybe the immune response of this patient is really weak because this patient has not had immunisations ever, so this is what will happen if the immune system is very poor.
Usually the palmar surface and solar surfaces are spared in Varicella, but this time it shows how extensive the damage is.
Right now the patient is recuperating and our main problem now is the drying up of the lesions.

Patient 7 9 yrs

RGB So this is Catherine, a nine year old who was admitted because of vesicular lesions. One week prior to admission she had vesicular lesions which initially started on the submandibular area, involving the paranasal region and eventually the rest of the face, which subsequently spread to the trunk and the rest of the body. About two days prior to admission the vesicular lesions became pustular and the perinasal area became infected and when she came in she was quite ill. She was lethargic, in bed, and the face was severely swollen with periorbital and perinasal oedema. She was febrile, and the wbc was 18,000 with neutrophils of 89%. Afterwards she was treated with Oxacillin IV and given Acyclovir for her Varicella. On the third hospital day her fever subsided and subsequently the swelling resolved, so she was taken off the IV drip. She is already on the sixth hospital day.

Chickenpox Discussion

DCA Now Paul, chickenpox is generally regarded as a fairly mild disease but it is actually quite severe in some of these cases, especially the older ones
What determines the severity?

PTH Well certainly if there is underlying immune suppression. These are the children and indeed adults that we are most concerned about, who may develop severe and overwhelming chickenpox. Then there are also previously healthy children who when they acquire chickenpox, develop severe complications for reasons that are not clear, so it is not just those who are known to be immunosuppressed.

DCA We've seen in one of our patients a very nasty facial cellulitis, presumably secondary to bacterial infection in the pustular stage.

PTH Yes

DCA Is that common?

PTH It appears to be common, and certainly in our setting here in the UK that is one of the most common reasons that we seen chickenpox in hospital- that is the development of secondary bacterial infections, usually with Group A streptococcus or staphylococcus aureus, and require antibiotic treatment for that. And that may be a progressive and overwhelming infection.

DCA Now Herpes zoster is obviously linked to chickenpox – it's the same virus – what's the situation regarding Herpes zoster as a source for chickenpox infections, for example?

PTH Well. Certainly and individual who has got shingles, or Herpes zoster, has got infectious lesions. But they usually are quite localised, for example a patch over the trunk, and so therefore often covered with clothes, and so therefore less infectious than for example a child with chickenpox who will have lesions often all over their trunk. So yes, it is a source of infection, but it is not as potent a source as an individual with chickenpox.

DCA Within a family or a school is the transmission of chickenpox by physical contact or is it by droplet infection?

PTH Well both, probably, and there appears to be excretion of the virus into oral secretions for example, which may in fact be detectable just before the rash

emerges, and that may be a source of infection. But there's probably airborne spread from the rash itself, if it's extensive.

DCA Turning to the question of prevention and immunisation, have things changed recently?

PTH Well in the sense that we do have an effective vaccine, a live attenuated Varicella vaccine, and this vaccine is very immunogenic in children and in adults, and it is very protective. There are some side-effects as with other live attenuated vaccines, in that a proportion will develop features of Varicella infection, some time after, such as rash and fever. That occurs in a very small percentage of healthy individuals, but can be more of a problem, as one might expect, in individuals who are immunosuppressed. The vaccine is widely used in some parts of the world, for example in the United States it's a routine vaccine, in other parts of the world such as the United Kingdom, and it has not been used routinely. There are a number of reasons for that. One is some uncertainty about the duration of protection that vaccine can produce because chickenpox occurring in older individuals and adults tends to be more severe than if it occurs younger. Thus if children are vaccinated and then the vaccine protection wanes over time one might simply be pushing back the age of disease, and if it occurs in the older individuals it may therefore be more severe. So that's one issue that is unclear at the moment. The other issue is the cost-effectiveness of the vaccine, because it is an expensive vaccine and it is true that chickenpox for most individuals is a relatively trivial illness, although as we have acknowledged, for some individuals it is not, and may be overwhelming and lead to mortality even in the UK. So it is not clear yet whether this would be a cost-effective vaccine to use in the UK

DCA In Japan and the United States, for example, it is regarded as being cost-effective is it?

PTH It is, and there are studies which have been done in those countries and elsewhere which have shown it to be cost-effective, although one might argue that it is only just cost-effective.

DCA And is that a single injection?

PTH It's a single injection for children under the age of 12, but if it's being given to older individuals then two doses are required.

DCA What about the issue of immunisation in preventing later Herpes zoster?

PTH In Japan they have had more than 20 years experience and they have not described, for example, that individuals that received the vaccine are more likely to get shingles later on. They seem less likely to get shingles later on. The other set of experiences is the immunisation of immunosuppressed individuals, mostly in the United States, and mostly children with leukaemia, and they may be a model of what happens later on after immunisation. And in that group they seem to have a lower incidence of shingles than similar children that have natural chickenpox infection.

DCA So maybe if that is put into the cost-effectiveness equation – prevention of shingles – it might weigh in favour of immunisation?

PTH Yes, certainly shingles is a very important problem because it becomes so frequent in the elderly and it does have enormous costs, apart from the suffering that results. So yes, that needs to be part of the equation, and that is being looked at. I think part of the problem in places like the United Kingdom is it's quite difficult to get a handle on how frequent Chickenpox is, complications are, and how frequent shingles is in the elderly. This has been one of the problems in coming up with a thorough evaluation of things like cost-effectiveness.

DCA Well can we turn for a moment to the question of pregnancy and the neonate?
What's the situation there?

PTH Well there are two main issues about Chickenpox and pregnancy. One is that Chickenpox acquired by a pregnant susceptible woman in early pregnancy can cause a Congenital Varicella Syndrome, although that will occur in less than two percent. But that can be a very severe infection affecting the fetus such that there is deformity and long-term disability. That is the first instance. The second is where again a susceptible woman acquires Chickenpox herself around the time of delivery of her infant, because that infant will be exposed to Chickenpox from the mother in the absence of protective antibody because the mother has no protective antibody. And that can be associated with a severe overwhelming infection in the newborn infant.

DCA So in those two circumstances what advice should the doctor give?

PTH Well for the second of those, the usual advice would be that that baby should receive Varicella/Zoster Immune Globulin to provide antibody and thereby protect the infant. Furthermore if the infant were then to develop Chickenpox that would be aggressively treated with acyclovir. For the woman who acquires infection in early pregnancy, it is less clear what to do. Some would counsel on giving Varicella/Zoster Immune Globulin to that woman if she came in contact.

DCA Even just on the basis of having had contact?

PTH Yes, if she were known to be susceptible – if she were antibody negative.

DCA Right. So if there's doubt you would check her IgG levels, and then if she's negative you could offer her Varicella Immune Globulin..

PTH Yes.

DCA And that would be perfectly safe and a reasonable thing to do?

PTH Yes. Well it's generally felt to be, but there isn't a lot of data on this. But that would be a reasonable approach that many would use.

SCARLET FEVER (Scarlatina)

DCA Scarlet fever, which is much less common than it was a generation ago, is caused by the systemic circulation of a streptococcal toxin. This next patient is a young girl with tonsillitis who presented with features of Scarlet Fever and who also has a past history of Meningococcal Septicaemia.

Patient 1 5.5 years

PTH Adella has come into hospital two days ago, but we actually know her through our Clinic. At eleven and a half months she had meningococcal septicaemia. What symptoms did she have?

Mother. At first when we were at home she was very distressed, crying a lot. She was being sick

PTH And she had a fever with it?

M Yes she was very hot, and then a rash started to appear on her legs, and then it gradually went up her body onto her face, and then it was all over her body, and the rash started going really dark purple in colour; and that's when she was sent to hospital quite quickly.

PTH Okay. And how long was she in hospital for?

M About a month and a half.

PTH About a month and a half. So that was a long stay wasn't it?

And at the end of all that was she back to normal again?

M Yes, there is a slight... just a general development delay in Adella.

PTH Okay. And so she has been followed up since then.

And one of the things that we have been looking at was to see whether she had any problems with her immune system.

Chloe is Adella's younger sister. How old is Chloe now?

M Three and a half.

PTH Three and a half.

And Adella had meningococcal septicaemia when she was about eleven and a half months. And Chloe also had it. How old was she?

M She was one and a half.

PTH One and a half.

So that is another reason that we have been interested in following them both up in the Clinic, because it is obviously unusual for siblings to have meningococcal septicaemia, and it raises the possibility that there may be some inherited condition which predisposes them both to this sort of disease.

Although having said that, the investigations that we have done so far have not found anything.

PTH Describe what happened when she came in on Saturday?

M On Saturday morning it was about half past seven in the morning and she woke up vomiting.

And then by about two o'clock she was really quite hot.... she had four doses of Calpol (paracetamol) by then to try and bring her temperature down.

And she had been sick nine times, and by three o'clock I phoned my G.P. and went down to the clinic and... she just wasn't communicating.

She was red behind her ears and down the back of her neck, and she was all puffy around her cheeks.

And down below was all red and puffy.

It looked sore, and she had it underneath her armpits.

And the G.P. looked and sent her straight up to Casualty, and then bigger than pin-head dots started appearing on her face and legs and arms; by then she was constantly being sick.

PTH In the weeks before this, had she also been well?

M Yes. She had just had a stuffy nose.

PTH How long had she had that for?

M Just a couple of days.

PTH And do you know of anybody that she had been in contact with who may have had a similar rash or similar illness?

M No, not that I know of.

PTH And what did the doctors do when they first saw her?

M They gave her a general check and then did a blood test, and admitted her into hospital.

PTH And she was started on some antibiotics?

M Antibiotics... yes

PTH And on Sunday morning... how was she in herself?

M She was still very distressed.

She wasn't communicating very well.

Just sort of looking listlessly around.

Not really...

PTH So not her normal self?

M No, and she was still very hot... temperature still up and down,

PTH And what about the rash, had that changed?

M It was still on her arms; by Sunday morning on her arms and legs it was starting to spread a little.

PTH Was she eating and drinking?

M No.

PTH No... Just not interested?

M No, and she was on a drip, but then she started to take sips of water and fluids.

PTH And had she stopped vomiting by this time?

M Yes, as soon as the drip went on, after a couple of hours the vomiting had stopped.

PTH Did she have diarrhoea?

M Yes.

PTH Was she complaining of tummy pain at all with this?

M No.

PTH Was she complaining of a sore throat?

M She wasn't complaining but she was finding it quite difficult to swallow.

PTH And do you think that was because her throat was sore?

M I think so... yes.

PTH And so it was her rash...
What about her eyes, were they affected?

M They had turned red.

PTH Okay.
Was there any discharge at all from them?

M No, not that I know of.

PTH And how do you find her this morning?

M She has perked up a lot.

PTH Yes.

M She is totally different.

PTH Well maybe we can just concentrate on the rash for a moment or two.
And just looking at her face she is red around the eyes and over the cheeks.
It is more concentrated around the orbits at the moment, but she is a little pale around the lips, so there is some circumoral pallor.
You can see some redness behind her left ear
Okay, so if we look at her groin... it is particularly concentrated in the folds of the groin there. There is also some desquamation. When did you notice the peeling of the skin?

M This morning.

PTH This morning was it... yes. So that is quite common.
And it is quite dusky in the folds of the skin there.

M Yes, it has actually come down.
It was to there.... the redness, and the swelling has gone down, it was really quite swollen.

PTH So that was quite swollen down there?
And you mentioned that in the face as well... with the redness there was swelling?

M Yes.

PTH As well, and that has also come down?

M Yes.

PTH I think we have seen all the major features of the rash that are left.

But... so it was really concentrated on the face and around the neck, and in the groin?

M Yes.

PTH *Are you going to poke your tongue out for us so we can see it on the camera?*
So you can see her tongue is quite red actually isn't it?
Yes, and she has quite red tonsils.

Discussion

DCA How would you describe this rash, and what do you attribute it to?

PTH Well she has a rash which is erythematous... macular.

The distribution is unusual in that it is concentrated mainly on the face and neck, axillae and in the groin, with some involvement of the anterior trunk but otherwise not generalised.

What we have seen today is of course a rash which has faded over a couple of days, so it is now not as florid as it was.

The illness which was sudden in onset with vomiting and fever and then a rash, and which is also characterised in her case by some pharyngitis, would be compatible with a streptococcal infection.

The classic rash associated with streptococcal infection is that of scarlet fever.

DCA And how would that rash differ from Adella's?

PTH Characteristically that rash again involves the face with erythema over the face, some circumoral pallor

DCA Which she shows

PTH Which she showed...is a generalised rash however, apart from that and is characterised by its colour - scarlet, so it is quite dark, and its feel.... it is generally described as 'like sandpaper'.

And so if one is to look at the rash quite closely it is a red background with raised red papules within it.

The pharyngitis, tonsillitis would be a part of that, although scarlet fever may also occur through streptococcal infections, of wounds, for example.

So it is not necessarily just of the pharynx.

And then the other feature is the involvement of the tongue, the **strawberry tongue... white strawberry tongue** evolving on to a **red strawberry tongue**.

The white strawberry tongue is the whitish coat with red papillae protruding through them and then that becomes denuded leaving the red strawberry tongue.

And then finally the other feature is the peeling of the skin afterwards.

DCA Right, and this is caused by a streptococcal exotoxin I think isn't it?

PTH That's right... an erythrogenic exotoxin.

DCA So is it a predicted value for example in determining whether the child is going to get rheumatic fever?

PTH No it is not.

The presence of Scarlet Fever itself as opposed to any other streptococcal infection may or may not lead on to Glomerulonephritis and Rheumatic Fever.

They are in fact dictated by the strain of streptococci that is causing the infection.

So it can equally happen with streptococcal infections, tonsil infections without the characteristic Scarlet Fever rash.

DCA Scarlet fever was one of the classical childhood exanthems.

PTH Yes.

DCA Why is it so much less common now?

PTH We think one factor certainly is the early use of effective antibiotics.

Secondly, improvement in socio-economic conditions. - Less crowding in houses for example, but more than that we don't know.

It is also theoretically possible that the strains of streptococci that are responsible have become less frequent.

DCA What are the other important cutaneous manifestations of streptococcal infection?

PTH One that is important and severe is Streptococcal Toxic Shock Syndrome, which is similar in presentation to the more and better known perhaps Staphylococcal Toxic Shock Syndrome, but is characterised by an intense erythrodermic rash, but in association with high fever, systemic toxicity, hypotension, multi-organ failure, and again a manifestation of a streptococcal toxin.

Other skin manifestations includes such things as Erythema nodosum which is probably an immunologically-mediated manifestation.

And then local infections - Erysipelas for example is a specific streptococcal skin infection.

And cellulitis may also be a manifestation of streptococcal infection.

Meningococcal Disease

DCA Finally, for this new edition of the film I discussed with Dr Heath the confusing issue of immunisation against different strains of the meningococcus. This is relevant to preventing the disease in childhood and also in adults travelling to parts of the tropical world where some strains are prevalent.

DCA What's the situation now regarding immunisation against the meningococcus?

PTH In the UK since 1999 we have had a very effective vaccine against a certain type of meningococcal disease – that is the sero-group C strain. And this vaccine is a conjugate vaccine, so it is similar, for example, to the HIB conjugate vaccine that is being routinely used. And it is given at 2, 3 and 4 months of age in the UK – so part of the routine infant schedule and it has proved very effective at reducing the incidence of this disease. In the UK it was also given to older children and adolescents at the start of the campaign, because they too are at risk of meningococcal disease, in fact the epidemiology is such that the highest incidence rates are in those less than one, and then in the teenage years there's a second peak, which is why they have also been targeted with the vaccine.

So the C strain is covered by this particular conjugate vaccine.

DCA And the C strain is the one most likely to cause meningitis, is it?

PTH Well, no, in the UK there are two main strains – Group B and Group C. Group B in fact is more common than Group C, but we do not have an effective vaccine against Group B. In other respects they produce similar symptoms and signs, although it appears that the C strain is responsible for disease in older children and teenagers. For example in the UK, at least prior to vaccination outbreaks in Universities and Colleges were frequent every year, and most of that was due to the C strain. And we now don't see that.

DCA And is there any cross-immunity provided against the B strain?

PTH No

DCA So ideally you'd want a double conjugate/

PTH Yes, what you really need is a vaccine against the B strain, that's right, but for technical reasons it is not possible to create a vaccine in the same way against the B capsule.

DCA So what about travellers to developing countries? Would you recommend that under some circumstances they have immunisation?

- PTH** Yes, there are certainly other meningococcal vaccines that should be considered. In some parts of the world Sero Group A is a common cause of meningococcal disease. For example in parts of Africa. And there is a vaccine available which includes Sero Group A. In general there are two types of vaccine. There's a vaccine which contains A and C, and then there's what is called the quadrivalent vaccine. Which includes A, C, Y and W135. Y and W 135 are less frequent causes of meningococcal disease, though recently W135 has been particularly associated with travel to the Middle East and to the Hajj. These vaccines are polysaccharide vaccines and though effective over the age of two years are not effective for young infants, so are not useful in that age group. And the B presumably can still escape.
- PTH** Absolutely, the B is not covered by any of the vaccines that we have, and B remains a very important cause, and indeed in the UK is the most common group responsible for meningococcal disease, but we do not have an effective vaccine against B
- DCA** So even if you have had these vaccines and you develop a purple non-blanching rash it's meningococcal disease until proved otherwise.
- PTH** Absolutely. And of course no vaccine is 100% effective, so it is still possible to get the disease despite being vaccinated. But yes, B is not covered and can still cause disease in these people.
- DCA** Finally, if the doctor has a clinical suspicion, because of a non-blanching purpuric rash in an ill patient – that this might be meningococcaemia, what should he do?
- PTH** The important principles are going to be early administration of antibiotic. And for example in the setting in the community, if the person is being seen by a General Practitioner, then an intramuscular dose of penicillin as quickly as possible is recommended. The other very important aspects of course are resuscitation, which would then be done by the ambulance attendant and A & E, so responding quickly to that clinical scenario is the main message and using antibiotics.

Summary

- DCA** I hope that you have found the patients and the discussions in this film both interesting and informative.
You should now...
- Understand the aetiology, mode of transmission, pathophysiology, clinical features and management of these four diseases
 - Appreciate the complications of measles and its high mortality especially in the developing world, and be an effective advocate for MMR vaccine, or, in developing countries, its measles component.
 - Understand the link between Varicella and Herpes Zoster
 - Appreciate the complications, prevention and treatment of Varicella and specific risks in older individuals, pregnant women, neonates and the immunologically compromised
 - Recognise the types of rash seen in response to streptococcal infection, especially Scarlet Fever
 - Understand the vital importance of immediate antibiotics in any ill person with a streptococcal or a non-blanching petechial rash
 - And know what is available for immunisation against the meningococcus, and their ineffectiveness against the B strain

A thorough understanding of the diseases we've seen is surely a basic part of the education of every practitioner who's involved with child health and preventive medicine.

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