Clinical Features Of Epidemic Adenovirus Ocular Infection- A Case Report In Eket Coastal Town In Nigeria

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**Article ID:** WMC001349
**Article Type:** Case Report
**Submitted on:** 17-Dec-2010, 07:10:50 AM GMT  **Published on:** 18-Dec-2010, 11:58:29 AM GMT
**Article URL:** [http://www.webmedcentral.com/article_view/1349](http://www.webmedcentral.com/article_view/1349)
**Subject Categories:** OPHTHALMOLOGY
**Keywords:** Adenovirus, Epidemic, Hygiene, Clinical features, Anti-virus, Corticosteroids

**How to cite the article:** Ubani U, Ekwenye U. Clinical Features Of Epidemic Adenovirus Ocular Infection- A Case Report In Eket Coastal Town In Nigeria. WebmedCentral OPHTHALMOLOGY 2010;1(12):WMC001349

**Source(s) of Funding:**
SELF
Clinical Features Of Epidemic Adenovirus Ocular Infection- A Case Report In Eket Coastal Town In Nigeria

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Abstract

Background
Adenovirus cause most cases of viral infections of the eyes, which are highly contagious with the tendency to occur as epidemics.

Method
An 8-year old school girl presented to the clinic with complains of difficulty to open her eyes while she woke in the morning, gritty sensations and watery discharges on both eyes; with clinical features of multiple petechial hemorrhages seen within the injected conjunctivas, a bilateral inferior palpebral folliculitis, left eye more severe and a conjunctival pseudomembrane.

Result
Palpation of the left preauricular area showed lymphadenopathy. Serological test implicated adenovirus type 8. Patient was subsequently treated as outpatient; in the office both eyes were thoroughly lavaged with a sterile saline rinse and the pseudomembrane was peeled. 2 drop 0.5% lotprednol etabonate ophthalmic suspension was applied to minimize bleeding. 2 drop 0.5% Visine ophthalmic preparation, a vasoconstrictor was prescribed q.i.d. OU along side GenTeal artificial tears q.2h. OU. In addition, cold compresses were recommended p.r.n. There was complete resolution of the conjunctiva by the 5th day of check-up.

Conclusion
Better hygiene such as frequent hand wash and furlough help control spread.

Introduction

Adenoviruses are viruses of the family Adenoviridae. They were first isolated in human adenoids, from which the name was derived. They are DNA and double stranded animal virus with no envelope. They are unique among icosahedra shaped viruses in that they have structures called fibers projecting from each of the vertices, with which it attaches to cells to cause an infection. Adenovirus has a variety of clinical effects throughout the body. Most commonly, they cause a variety of respiratory infections from bronchitis, to croup, to pneumonia. Adenovirus infection is also responsible for diarrhea in children, acute hemorrhagic cystitis, rashes, and rarely meningocencephalitis. At least 47 distinct antigenic types have been isolated from man. Almost half of these cause ocular infections. The most commonly associated serotypes include adenovirus 8, 19, and 37 and less frequently 2-5, 7, 9, 10, 11, 14, 16, 21, and 29. The two most common self-limiting forms of adenovirus eye infection are - Epidemic keratoconjunctivitis (EKC) and Pharyngoconjunctival fever (PCF). EKC often presents as subconjunctival hemorrhage, a bilateral inferior palpebral follicular conjunctivitis, sub epithelial corneal infiltrates and conjunctival pseudomembrane that adhere firmly to the underlying conjunctival surface. While PCF is characterized as the name implies with the triad of pharyngitis (sore throat), fever and follicular conjunctivitis. In Nigeria epidemics adenovirus ocular infection is called "Apollo" for it was first observed after Apollo II mission to the moon. Adenovirus good viability on environmental surfaces, improve the epidemic potential of these viruses and the drop of the prevalence of protective antibodies found in the general population makes every individual to be considered susceptible to their infection. This case reports an 8-year old girl that presented with ocular features during an epidemic outbreak in Eket, a coastal town in Nigeria.

Case Report(s)

An 8-year old girl accompanied by the mother presented to the optometric facility of Central ophthalmic clinics at Eket, on 20th July 2008; with complains of difficulty to open her eyes while she woke in the morning, gritty sensations and watery discharges on both eyes. The mother, incidentally a teacher in her school disclosed previous and spreading cases of itchiness and reddishness of the eyes amongst pupils of the school for the past 2 weeks. She also remarked a history of this incidence about 4 years ago in the same locale. Penlight examination revealed clear cornea that did not stain with fluorescein. The right eye had a 1+ conjunctival...
conjunctiva. Occasionally, pinpoint (petechial) to 2mm in size especially on the inferior palpebral folliculitis; and avascular lesions ranging from 0.2 seen clinically as conjunctival injection with signs and symptoms is frequently manifested. This may range in severity, a common constellation of severe, disabling visual difficulties. Though symptoms self-limiting conjunctivitis, with the potential to produce enters the acute phase were they produce a mild, incubation period of five to 12 days, the disease infectious period ranges from 3 days before, to 14 days after onset of symptom. After a history of adenovirus infection is also responsible for diarrhea in children, nasal passages to the conjunctival surface of the eyelids. The virus isolation in a cell culture requires human cells and primary human embryonic kidney cells are Adenovirus is disseminated from the infected person via droplets of respiratory or ocular secretions and feaces. With the portals of entry into the new human host as the nose, mouth and eyes by airborne respiratory droplets or direct transfer from one’s fingers to the conjunctival surface of the eyelids. The incubation period ranges from 3 days before, to 14 days after onset of symptom. After a history of adenovirus infection occur in 50% to 75% of all cases. May last for several months, and if along the visual axis, they may cause decreased vision or glare. In 20 – 50% of cases, corneal opacities can persist for as few weeks to months (rarely up to 2 years). In rare cases, conjunctival scarring and symblepharon are secondary to membranous conjunctivitis.

### Discussion

Adenoviral infection has a variety of clinical effects throughout the body. Most commonly, adenovirus causes a variety of respiratory infections from bronchitis, to croup, to pneumonia. Adenovirus infection is also responsible for diarrhea in children, acute hemorrhagic cystitis, rashes, and rarely meningoencephalitis. Adenovirus is disseminated from the infected person via droplets of respiratory or ocular secretions and feaces. With the portals of entry into the new human host as the nose, mouth and eyes by airborne respiratory droplets or direct transfer from one’s fingers to the conjunctival surface of the eyelids. The infectious period ranges from 3 days before, to 14 days after onset of symptom. After a history of adenovirus infection occur in 50% to 75% of all cases. May last for several months, and if along the visual axis, they may cause decreased vision or glare. In 20 – 50% of cases, corneal opacities can persist for as few weeks to months (rarely up to 2 years). In rare cases, conjunctival scarring and symblepharon are secondary to membranous conjunctivitis.

### Laboratory diagnosis of adenovirus

The duration of adenovirus excretion varies in the conjunctiva; it is 3-5 days for PCF and 2 weeks for EKC. Thus adenovirus samples could be recovered from conjunctival swab. The virus isolation in a cell culture requires human cells and primary human embryonic kidney cells are most susceptible but usually unavailable. While
established human epithelial cell lines, such as HEP-2, Hela and KB, are sensitive but difficult to maintain without degeneration for the length of time (28 days) required detecting some slow-growing natural isolates. The development of cytopathic effects – rounding and clustering of swollen cells – indicates the presence of adenovirus in inoculated cultures. Adenoviruses cause increased glycolysis in cells, so the growth medium tends to become highly acidic on infected cultures. Isolates can be identified as adenoviruses by immunofluorescence tests using an anti hexon antibody and infected cells. Hemagglutinin inhibition and neutrality tests measure types where specific antigens can be used to identify specific serotypes.

Adenovirus detection may be made rapidly using the “shell vial” technique. Viral specimens are centrifuged onto tissue culture cells. Cultures are incubated for 1–2 days and are then tested with monoclonal antibodies directed against a group – reactive epitope on the hexon antigen. Nasal epithelial cells from a patient with PCF may be stained directly to detect viral antigens.

Characterization of viral DNA by hybridization or by restriction endonuclease digestion patterns can identify an isolate as an adenovirus and group it. These approaches are especially useful for types that are difficult to cultivate. Polymerase chain reaction (PCR) assays can be used for diagnosis of adenovirus infection in conjunctival samples or tear fluids, using primers from a conserved viral sequence, which can detect all serotypes. However, the sensitivity of the PCR assays may result in the detection of latent adenoviruses in some patients.

Infection of humans with any adenovirus type stimulates a rise in complement – fixing (CF) antibodies to adenovirus group antigens shared by all types. The CF test is an easily applied method for detecting infection by any member of the adenovirus group. A four fold or greater rise in complement – fixing antibody titer between acute – phase and convalescent – phase sera indicates recent infection with an adenovirus, though it gives no clue about the specific type involved.

If specific identification of a patient’s serologic response is required, Neutrality test or Hemagglutination inhibition can be used. In most cases, the neutralizing antibody titer of infected persons shows a fourfold or greater rise against the adenovirus type recovered from the patient.

Epidemiology

Adenovirus infections are highly contagious; and the factors associated with community outbreaks are the use of swimming pools (streams), overcrowded condition, poor hygiene rules, shared use of personal objects and direct physical contact. Outbreaks can sometimes be traced to infected individuals or locations. Though the case is a school child, it is not possible to identify the initial source of infection of this outbreak. It could be traced to such locations as the waterside, where the coastal city domestic and economic need largely depends on. In addition, the practice of hawking, particularly by school children (after school hours), through the neighbourhood increase the possibility of contact, either with others who had developed the disease or were still asymptomatic and/or with different surfaces and objects. In the school, smaller classrooms increase the likelihood of more physical contacts. A confirmed characteristic of adenovirus is its high capacity to conserve the infective potential and to resist and persist over along periods of time (over 28 days) on surfaces such as lockers, chairs and handles in unfavourable conditions.

In Nigeria, the actual prevalence and incidence are unknown, because the infection does not have to be reported to any health board.

Management of Adenovirus ocular infections

As of 2002, there is no proven effective treatment for adenoviral conjunctivitis. Military recruit in USA were vaccinated for adenovirus types 4 and 7 between 1971 and 1996, but the vaccine is currently unavailable. Case report suggests that the antiviral agent cidofovir may be effective, but a more recent pilot study showed no benefit, and currently there are no antiviral drugs approved for adenoviral conjunctivitis. The use of topical corticosteroids for adenoviral conjunctivitis remains controversial. Topical corticosteroids may be useful if the acute phase (first week or two) is severe and causing significant patient discomfort in sub epithelial cornea infiltrates, particularly if they persist and reduce visual acuity. They may also help reduce pseudomembranes and if the pseudomembrane is manually peeled usually every 2-3 days, a corticosteroid eye drop may be needed to prevent scarring. However, corticosteroids have been shown to enhance and prolong viral replication and shedding. Corticosteroids have also been implicated in producing chronic adenoviral conjunctivitis. Management of childhood adenoviral conjunctivitis with Corticosteroids is made particularly difficult by the limitations of a pediatric examination, including the difficulty of measuring intraocular pressure and obtaining a detailed slit lamp examination. Hence corticosteroids are avoided in treating most cases of pediatric adenoviral conjunctivitis. Mild steroid therapy must be evaluated on a case-by case basis. Chronic, low-dose administration may need to be tapered over weeks to
months.
Nonsteroidal anti-inflammatory eye drops may offer some symptomatic benefit without the risk of topical corticosteroids. Recent studies are of the opinion that topical nonsteroidal anti-inflammatories are no more effective than artificial tears in relieving patient symptoms in adeno-viral conjunctivitis. Well though, because of the self-limited nature of adenovirus infections, in mild to moderate cases it is preferable to use mild vasoconstrictors, cold compresses, and/or artificial tears as supportive therapy (to relieve symptoms).
Secondary co-infections with bacteria, Chlamydia, and acanthamoeba can occur and require specific treatment.

Conclusion

Both a high number of cases and a long period before the outbreak is resolved have been characteristic in other EKC outbreaks described in the literature reflecting the difficulty of controlling transmission despite the establishment of rigorous prevention measures. These difficulties have led to the development of infection control policies and procedures (ICPPs) in institutions, which have been demonstrated to be effective in reducing the number of outbreaks and cases. The control measures implemented in this outbreak were based on methods of personal hygiene health education, especially regarding frequent hand washing, cleaning and disinfections of surfaces, use of school administrative norms that favours the resolution of the outbreak (withdrawing affected pupils, restricting access to common areas).

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Illustrations

Illustration 1

ADENOVIRUS CLINICAL PICTURES

Fig. 1: Lymphadenopathy

Fig. 2: Follicular reaction

Fig. 3: Sub-epithelial corneal infiltrates

Fig. 4: Pseudomembrane

Fig. 5: Tarsal conjunctival membrane

Fig. 6: Symblepharon
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