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Skin lesions caused by Orthopoxvirus, cowpox - case report from Poland

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Abstract

Background:

Despite the elimination of smallpox, other orthopoxviruses, including cowpox virus, still infect humans. Wild rodents are its natural reservoir. Infections in humans are commonly reported from contact with sick domestic cats, rarely directly from rats. Cow pox in humans is a rare zoonotic disease, the diagnosis of which is problematic due to its rarity and thus the lack of clinical experience.

Case report:

Presented with a summary of the available clinical data on a 15-year-old boy who became infected with cowpox by a domestic cat.

The patient developed cutaneous macular changes in the facial area. Within 3 weeks of the onset of symptoms, the lesions progressed through the papular, vesicular and pustular stages before forming a hard black eschars (2 cm in diameter) with erythema and edema and regional lifadenopathy. Differential diagnosis consisting of cat scratch disease, anthrax and brucellosis excluded microbiological examination. The lesions left scars after 8 weeks of continuous topical antiseptic treatment.

Conclusions:

The clinical course may be complicated, and the improvement takes 4 to 8 weeks. Infection which entered through the skin changes was the cause of antibiotic therapy. Cowpox should

be suspected in patients with poorly healing skin lesions accompanied by a painful black eschars with erythema and local lymphadenopathy.

Key words: orthopoxvirus, cowpox, eschar, skin lesion.

Introduction

Human infections by orthopoxvirus (OPV) infections are reported more frequently. This is partly attributed to the cessation of smallpox vaccinations and the concomitant loss of immunity at the population level [1]. OPV zoonotic species including monkey pox virus (MPXV), cowpox virus (CPXV), camelpox virus (CMPV) and vaccinia virus (VACV) are associated with increasing outbreaks worldwide [2] cause acute disease in humans and domestic animals [3]. CPXV has been reported in Europe in both humans and animals, including dogs, cats, primates, elephants, and various other zoo animals [4]. It is believed that the wild rodents, especially voles, mice, rats and forest, are the natural reservoir of CPXV, and its transmission to humans occurs mainly through direct contact with domestic cats, but also with domestic rats usually through a bite or scratch. Cats probably become infected while hunting and eating (infected) mice. The symptoms of cowpox, as in the described case, are initially fever, malaise, headaches. Initial skin lesions turn into black dry concave eschars.

Objective

Human cow pox is a rarely recognized zoonotic disease, therefore doctors' awareness of its occurrence should be improved. Publication of individual cases can provide important information illustrating the disease, clinical course and laboratory diagnosis.

Method

Medical records of a patient with OPV infection were reviewed retrospectively. Who was hospitalized from October 30, 2012 to November 9, 2012 at the Provincial Hospital No. 2 in Rzeszów in the pediatric ward. From November 9, 2012 to November 16, 2012 in the infectious diseases ward in Łańcut. From November 16, 2012 to November 28, 2012 at the Provincial Infectious Diseases Hospital in Warsaw.

Results

The 15-year-old boy was admitted on October 30, 2012. to hospital because of of infiltrative-erosive changes on the skin of his face, with the current fever and regional lymphadenopathy. Good general condition on admission. In a physical examination of the skin near the nose, chin on the left cheek, itchy papular changes on the eyelid of the left eye, on an inflammatory basis, surrounded by a shaft with a fairly deep depression in the middle of the lesion.

Infiltration in the subcutaneous tissue on the left cheek, swollen lymph nodes around the left mandibular angle. The results of laboratory tests (ESR, PCT morphology, electrolytes, coagulation, blood chemistry panel, urinalysis) – correct. The results of microbiological tests (blood smear, blood culture) and serological tests for infection of EBV, CMV, HBV, HCV, HIV- correct.

Based on the clinical picture, the consulting dermatologist put forward a suspicion of cowpox virus infection. In an interview, the patient reported having had a cat that had scabs on its skin. An ophthalmological consultation was performed due to the difficulty in opening the left eyelid due to edema. The treatment included parenteral irrigation, clindamycin, acyclovir, eye drops with an antibiotic (amikacin), and paracetamol as needed. Due to the lack of clinical improvement, increasing swelling of both eyelids, infiltration on the left cheek, after securing the material for virological tests, intravenous immunoglobulin preparation was transfused. The material collected from skin lesions was transferred to the virological laboratory of the National Institute of Hygiene in Warsaw.

Despite the treatment, the local condition deteriorated, facial edema increased, and the left cheek was infiltrated. Craniofacial CT was performed - infiltrative changes in the eye sockets and zygomatic bones were excluded. Antibiotic therapy was modified (Ceftriaxone + Vancomycin), another dose of immunoglobulins was administered. Further increase of edema was observed, as well as the appearance of a generalized maculopapular rash all over the body accompanied by itching. Additionally, antihistamines and analgesics were used, and vancomycin was discontinued. Then, in the diagnostic tests, anthrax infection, cat scratch disease, was also taken into account. Antibiotic therapy was modified for the second time - high-dose crystalline penicillin, clarithromycin and ciproflokasacin were ordered.

On day 10 of hospitalization, the boy remained in a fairly good general condition with massive eyelid edema in the left eye and leakage of serous fluid from the eyelid fissure. Present facial skin lesions in the form of black deep crater-shaped eschars and painful infiltrative lesions of the left cheek. In the area of the trunk, lower and upper limbs, there is a generalized, fine-speckled rash - probably a reaction to the previously used vancomycin [4]. During hospitalization was observed recurrent slight epistaxis, and pain in the left half of the face. In the smear of the lesions and the molecular method, it detected trace amounts of the plasmid gene encoding the protective antigen Bacillus Anthracis, the results towards tularemia were negative. In a serological study. On day 14, IgM antibodies to leptospirosis were detected.

On the 16th day, at the patient's request, he was transferred for further treatment at the Reference Center in Warsaw. Ultrasound of the salivary glands was performed - infiltration in the soft tissues and the salivary gland with hypoechoic areas up to 12mm and enlarged submandibular lymph nodes, the angle of the mandible and the cervix. Treatment with ciprofloxacin was maintained.

Stable and discharged home on day 29. Recommendations for maintaining antibiotics and for a check-up in 3 weeks.

In the preliminary study results (12/12/2012) orthopoxvirus antibody levels were positive. 15/02/2015 the results of the research carried out as part of the scientific cooperation with the Koch Institute in Berlin on the material of skin lesions - PCR for Cowpoxvirus and serum tests for Orthopoxvirus IgM and IgG were positive.

Discussion

Cowpox is the most common in Europe and, despite its name, it is rare in cattle. The common host is the domestic cat from which human infections are most often acquired [5]. Concentrated virus aerosols can cause Orthopoxvirus infection, mostly in immunocompromised people. [6] Vaccinia infection in Europe poses an occupational hazard to veterinary workers and, to a lesser extent, agricultural workers. The initial symptoms of Orthopoxvirus infection include fever, malaise, headaches and body aches, and sometimes vomiting. Individual lesions, surrounded by inflammatory tissue, develop and progress through macules, papules, vesicles and pustules until they finally become dry eschar after 2-3 weeks. Healing usually takes 4-6 weeks. This classic course was observed in the described patient. The clinical diagnosis of infection was based on a history (contact with the cat) and skin symptoms. Severe swelling and erythema can affect large areas of the body in severe infection. Encephalitis (altered mental status and focal neurological deficits), myelitis (dysfunction of the upper and lower motor neurons, sensory levels, and intestinal and bladder dysfunction), or both, may be due to an Orthopoxvirus infection. Rarely, orthopoxiviruses can be detected in the cerebrospinal fluid.

The same Orthopoxvirus infection changes can be confused with zoonotic Parapoxvirus infections, anthrax or Herpes virus infections [7]. In the event of skin symptoms suggesting pox infection, the diagnosis of suspicion (OPV infections such as vaccinia, monkey pox, parapox, molluscum contagiosum, cutaneous anthrax, mycoses, cat scratch disease) can be verified by virological or microbiological and molecular methods. In the case of skin symptoms suggesting pox infection, the diagnosis of suspicion (OPV infections such as vaccinia, monkey pox, parapox, molluscum contagiosum, cutaneous anthrax, mycoses, Bartonella henselae) can be verified by virological or microbiological and molecular methods. OPV infection can be diagnosed using serological test methods. They have proven to be good methods of ELISA and immunofluorescence. Detection of OPV-specific IgMs indicates an acute OPV infection. The immune response against different OPV species cannot (so far) be routinely differentiated due to the fact that the antigens are closely related within the genus. Differentiation is possible to a limited extent by the complex and time-consuming pre-adsorption procedures carried out on sera with antigenic preparations of various OPV species, followed by the testing of reactivity in ELISA or immunofluorescence tests [8]. Detection of a test nucleic acid (NAT) Method by polymerase chain reaction (PCR) have proven to be particularly useful for identifying and differentiating species OPV and differential diagnosis of Poxviridae (eg. OPV PPV and MOCV) and other viruses such as Varicella Zoster Virus (VZV) and herpes simplex virus (HSV), but also bacteria such as Bacillus anthracis [9].

The presented case shows that human vaccinia pox is a relatively serious localized infection. The analyzed patient presents a history of failure of antibiotic therapy and acyclovir treatment and is similar to that of other authors. Antibiotics, antivirals, and antiseptics are only preventive against bacterial superinfections [10]. The skin lesions are self-limiting, infection takes time. One of the drugs that have been tested for their effectiveness in OPV therapy is cidofovir, which has a broad spectrum of activity against DNA viruses including herpes-, adeno-, polyoma-, papilloma- and poxviruses. Among pox viruses, in activity, cidofovir administered in various ways (intraperitoneal, intranasal and topical) has shown in vitro activity against OPV, including CPXV; however, its use is limited by nephrotoxic effects [11]. Brincydofowir (CMX001) lipophilic nucleotide analogue has a significantly higher potency than cydofovir against DNA viruses is administered orally and is not nephrotoxic. CMX001 treatment has been tested in animal models: MPXV, rabbit pox virus, for its effectiveness in the pox epidemic [12]. Other medicines were also tested, including oral tecovirimat, thiosemicarbazones, nucleoside and nucleotide analogs, interferon, and interferon inducers, but none have been proven as an effective treatment [13]. In the past, vaccination against smallpox may have provided cross-resistance to CPXV and other OPV zoonoses [14].

Conclusion

Vaccinia pox appears to be a rare and difficult to diagnose disease based on the large number of diagnostic tests performed to rule out various differential diagnoses. In the case of unclear necrotic skin lesions, the primary diagnosis is bacterial dermatitis. When a patient has a difficult to heal skin lesion accompanied by a painful black scab with surrounding erythema and local lymphadenopathy, and if the patient has been in contact with animals, the diagnosis of zoonotic OPV should be considered. PCR is the main method of diagnosing CPXV infection. Patients who come into contact with domestic animals, rodents or cattle should be reminded about hand hygiene.

Conflicting interests

The authors declare that there is no conflict of interest.

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