



## Pasteurellosis in Rabbits

Aditya Sharma<sup>1</sup>, Satuti Sharma<sup>1</sup> and Anand Kumar Singh<sup>2\*</sup>

<sup>1</sup>Department of Veterinary Pathology, Khalsa Veterinary College, Ludhiana, Punjab, India

<sup>2</sup>Department of Animal Husbandry and Dairying, SHUATS, Prayagraj, Uttar Pradesh, India

\*Corresponding Author: Anand Kumar Singh, Department of Animal Husbandry and Dairying, SHUATS, Prayagraj, Uttar Pradesh, India.

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*Pasteurella multocida* is the most common bacterial pathogen in laboratory rabbits. Pasteurellosis refers to a group of illnesses caused by this organism. *P. multocida* is most commonly found in rabbit nasal cavities, where it causes rhinitis or chronic asymptomatic infection. Infection from the nasal cavity can spread to other parts of the body. Among other clinical manifestations, this can result in pneumonia, otitis media, conjunctivitis, genital tract infections, abscesses and septicemia.

### Etiology

*Pasteurella multocida* is a non-spore-forming Gram-negative coccobacillus with bipolar staining. *P. multocida* subsp. *gallicida*, *P. multocida* subsp. *multocida*, and *P. multocida* subsp. *septica* are the three subspecies based on their ability to ferment dulcitol and sorbitol. *P. multocida* subsp. *multocida* is found in roughly 80% of rabbit isolates. Based on capsular antigens, *P. multocida* is classified into five capsular serogroups (A, B, D, E, and F). Serotypes A and D are frequently associated with rabbit pasteurellosis. Serotype F has also been mentioned. The majority of *P. multocida* serotypes in India are A and B.

### Transmission

Infection spreads via the respiratory tract (inhalation with wet or dried discharge from diseased rabbits). Direct contact occurs during mating between chronically (carrier) infected does and their litter in the first few weeks after kindling or between breeding pairs. Infection spreads from farm to farm via air or mechanical transmission by attenders, rats, and flies. *P. multocida* colonizes

the pharynx through its capsule after entering the animal's body via inhalation. Stress factors cause bacteria to replicate and enzymes (neuraminidase) to be released, causing injury and damage to the mucociliary apparatus.

**Important clinical manifestations of pasteurilla in rabbits are mentioned below:**

### Snuffles

An acute, subacute, or chronic inflammation of the mucous membranes of the upper respiratory tract known as rhinitis (snuffles or nasal catarrh) is predominantly caused by *Pasteurella* and characterised by serous, mucoid, or mucopurulent nasal discharge with audible upper respiratory sounds. *P. multocida* infection is frequently the source of snuffles, however *Pseudomonas*, *Bordetella bronchiseptica*, *Staphylococcus*, and *Streptococcus* can also be present. Foreign objects in the nose and dental problems can both present with the same symptoms in pet rabbits. The disease is made worse by overcrowding, inadequate ventilation, dusty environments, and ammonia buildup.

### Clinical signs

The primary clinical sign of rhinitis is a serous nasal discharge; as the illness worsens, a mucopurulent discharge develops. The discharge may induce the rabbit to rub its medial forepaw against its nares, which can result in matted, stained, and moist hair. Occasionally, the fur directly above the paws on the inside of the front legs may become matted and caked with dried exudate, or this area may be clean with thinning fur as a result of the dog pawing at the

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nose. There may occasionally be no noticeable discharge from the external nares. The name “snuffling” comes from the sounds made when mucus and inflammatory exudates block the nares and nasal passageways. Reduced scent perception or the inability to simultaneously chew and breathe cause anorexia.

### Pathology

In rabbits with acute rhinitis, the nasal passages are swollen, inflamed, and congested, and there may be mucosal ulcerations as well as the typical creamy-colored discharge. Chronic cases result in significant nasal mucosal inflammation and extensive shrinkage of the turbinate bones due to osteomyelitis. There is significant neutrophil infiltration of the tissues.

### Otitis media or wry neck” or Head tilt

Rabbits with otitis media typically exhibit no clinical signs. Neurological symptoms of vestibular disease, which can arise when an infection develops along the vestibulocochlear nerve, include rolling and nystagmus. The discharge from the middle ear is viscous, viscid, and white or dull yellow to grey in colour. The tympanic bullae’s interior is opaque and light tan in colour. On microscopic examination, the epithelium lining the tympanic bulla frequently exhibits squamous metaplasia, while the submucosa and tympanic cavity frequently exhibit leukocytic infiltration.

### Conjunctivitis and dacryocystitis (weepy eye)

Nasolacrimal duct, which extends from the nose, is the most likely route of access to the conjunctiva. Conjunctivitis symptoms include chemosis (conjunctival swelling or edoema), ocular discharge, and conjunctival hyperemia. Epiphora may be the only symptom in some situations; in these circumstances, the infection may only affect the nasolacrimal duct.

### Pneumonia

Pulmonary lesions develop as a result of the progression of upper respiratory infections or via the hematogenous route. Acute necrotizing fibrinopurulent or fibrinohemorrhagic bronchopneumonia can range from localised cranioventral involvement to acute necrotizing fibrinopurulent or fibrinohemorrhagic bronchopneumonia. In the acute necrotizing form, affected lung tissue is swollen and moderately firm, frequently with concurrent fibrinous pleuritis and pericarditis. Pulmonary lesions can be limited to one lung

lobe in some cases. With fibrinopurulent pleuritis, pericarditis, and empyema, chronic disease can affect an entire lung lobe. Acute necrotizing fibrinopurulent or fibrinohemorrhagic bronchopneumonia is characterised by heterophil infiltration, destruction of the alveoli and small airways, and alveolar flooding with fibrinous exudate and erythrocytes histopathologically. Multinucleated giant cells may be found in the alveoli that are damaged. Abscesses can appear as a single or several symptoms of hematogenous lung infection.

### Genital tract infection

Infections of the reproductive tract can occur in both bucks and does. Any part of the tract can be affected, but metritis, orchitis, and epididymitis are the most common. These infections are most commonly acquired through venereal transmission, but they can also be acquired via hematogenous spread from other sites. Many genital infections are chronic and asymptomatic, but breeding animals have low conception rates. Does can cause vaginal discharge, especially during acute infections. Chronic infections frequently cause severe uterine dilatation and pyometra which can occasionally lead to uterine rupture. Bucks may develop swelling of the testicles or epididymis during the acute phase of orchitis or epididymitis; in the later stages, abscessation may happen. In peracute pasteurellosis transmural, necrotizing metritis occurs during the perinatal period, due to invasion via the dilated cervixes. Abortions and stillbirths may occur prior to the doe’s death. Affected individuals usually die within a few hours of exhibiting disease symptoms. At necropsy, fibrinous exudate with ecchymoses may be adherent to the uterine serosa. The uterine wall has thickened and necrotic material has formed. There is acute, necrotizing transmural metritis and serositis on microscopy, as well as changes in other organs consistent with bacterial septicemia.

### Abscess

Circumscribed abscesses with thick, yellow grey exudate may involve subcutaneous tissue, mammary glands, the brain, lung, visceral organs, and bone. Abscesses in the jaw are especially difficult to treat because they excavate bone and are difficult to drain due to the viscid nature of the pus in this species. Localized infections can spread to other parts of the body, resulting in symptoms like vegetative endocarditis.

### Acute septicemia

Without showing any clinical signs affected animals died was seen. Necropsy may reveal concurrent rhinitis and/or otitis media, but there is frequently no gross evidence of lesions. Microscopically, haemorrhage and variable thrombosis of small vessels, consistent with acute bacterial septicemia. Acute suppurative meningoencephalomyelitis can also occur, sometimes with optic neuritis and iritis.

### Diagnosis

The diagnosis should be confirmed by bacterial culture. In cases of suspected septicemic pasteurellosis, the organism should be recoverable from a variety of parenchymatous organs and heart blood. Nasal cultures, although useful in identifying carriers/shedders of the organism, will not necessarily detect all infected animals. The ELISA technique has been used to identify animals that were consistently negative for *Pasteurella* on deep nasal culture. Differential diagnoses: With suppurative lesions, bacterial culture should facilitate differentiation of *Pasteurella* infections from other pyogenic infections, such as staphylococcosis. Other bacterial infections associated with respiratory disease in this species are due to *Bordetella bronchiseptica*, *Staphylococcus*, and rarely, organisms such as *Klebsiella pneumoniae*.

### Significance

*Pasteurella* infections remain a major cause of disease and mortality in some commercial rabbitries. With the increased usage of specific-pathogen-free rabbits, pasteurellosis is becoming uncommon in research laboratories. The diagnosis of pasteurellosis has serious implications for the researcher. Unexpected deaths during routine procedures such as antibody production may represent immeasurable losses of valuable antigens and personnel time. Experimental manipulations may exacerbate a subclinical infection with *P. multocida*, resulting in clinical disease and possibly mortality. Aside from mortality associated with *Pasteurella* infections, the effects of the disease on various physiological functions, including the immune response, have not been studied adequately.

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