Case Report of Meningoencephalitis in Calves
Caused by *Escherichia coli*

Gholami*1, M R., Ezzi, A.*, Hablolvarid, M.H.* and Khaki, P.1

1. Pathology Dept., Razi Vaccine & Serum Research Institute,
P.O.Box 11365-1558, Tehran, Iran
2. Microbiology Dept., Razi Institute

Received 5 Aug 2002; accepted 15 Nov 2002

Colibacillosis is one of the most common diseases of new born farm animal caused by *Escherichia coli* (*E.coli*). In dairy calves the morbidity and mortality rates raised under intensified condition. The morbidity is usually 30% but may reach to 75%. Case fatality varies from 10% to 50%. The population mortality rate in calves can vary from a low of 3% in well managed herds to high of 60% in herds without management practice (Radostit *et al* 1994, Hall 1985, Burner & Gillespie 1973).

There are two different types of the disease, enterotoxigenic and septicemic. Enterotoxigenic strains of *E.coli* possess to ability to colonize in upper parts of small intestine and to produce enterotoxins, which cause diarrhea and dehydration (Linterman 1988, Girardeau *et al* 1988, Levine 1987). Most strain of septicemic form belong to certain serogroups and they have special virulence, and invading the tissues and systemic circulation via the intestinal lumen, nasopharyngeal mucosae and tonsilar crypts or umblical vessels to induce tissues damage in some organs and causes hepatitis, arthritis, peritonitis, pericarditis, pneumonia, nephritis, white spotted kidney (cortical abscesses) and meningoencephalitis (Jubb *et al* 1985, Goldberg 1994). Some bacteria such as *E.coli*, streptococcus, salmonella and pasturella sporadically may infect the central nervous system. Some times the

*Author for correspondence.
infectious may acquired prenatally and onset is usually with in a few days of birth up to 2 weeks, the portal entry of bacteria can be oral, interuterine and umbilical (Stephens et al 1981, Thomson 2001).

In this paper meningoencephalitis due to *E. coli* in calves was discussed.

**Case history**

One hundred cases of calves with clinical history of fever, diarrhea, dehydration and some of them with fibrinous artheritis, serosities, opisthotonus, convolution and tremore were necropsied. Whole brain removed from the skull and fixed in 10% formalin. After processing the tissues, 5μ sections from different parts of brain prepared and stained with hematoxiline and eosine (H&E) and Gram methods. Specimens from bone marrow, blood and brain were cultured on blood agar and Eosine Methilen Blue agar. The plates were incubated at 37°C for 24-48h in aerobic condition. Suspected colonies were differentiated by biochemical tests.

*E. coli* was isolated from bone marrow and blood of 80 cases. The bacterium was also isolated from 3 calves with age around 2 weeks and with clinical history of incoordination, head deviation artheritis, ataxia recumbency and high fever (42°C). 17 cases were negative. Gross lesions of brain include hyperhemia of meningial blood vessels and opacity of meninges due to presence of purulent exudate. The volume of cerebrospinal fluid was increased. Microscopy fibrinous leptomeningitis with neutrophile infiltration, engorgement of vessels and hemorrhages were noted (Figures 1,2). In brain mostly in cerebrum, areas of disseminated malacia with neutrophile infiltration and neuronal necrosis, congestion of vessels, hemorrhages, perivasculare-cuffing (P.V.C) with neutrophile infiltration were prominent (Figures 3,4). Special Gram staining of affected areas colonies of gram-negative bacteria were seen in some blood vessels and brain tissues (Figures 5,6).
Figure 1. Meningitis with neutrophile infiltration (H&E) ×100

Figure 2. Neutrophile infiltration in meninges (H&E) ×400

Figure 3. Necrosis and neutrophile infiltration in brain tissues (H&E) ×200
Figure 4. *P. V. C* with neutrophile infiltration in brain tissues (H&E) x200

Figure 5. Emboli of bacteria in leptomeningial vessels (Gram stain) x1000

Figure 6. *E. coli* bacteria in necrotic areas of brain tissues (Gram stain) x1000
References


