Encephalomyocarditis Virus (EMV, EMCV) in Elephants

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Etiology
- genus Cardiovirus, Family Picornoviridae
- worldwide distribution
- isolated from many mammals, including humans

Epizootiology
- rodents reservoir host
- pigs primary domestic animal host
- occurs in many captive non-domestic species, especially primates
- African and Asian elephants susceptible
- sporadic occurrences in South Africa, Australia, U.S.
  - first cases in Florida 1974-1977 (5 confirmed; 7 suspect) / 20 lions died
  - primarily Southeast U.S.
  - elephant cases in at least 8 zoos in 6 states
  - South Africa 1993-1994 – 60 cases in free-ranging bulls
  - fall and winter outbreaks in U.S.

Transmission and Pathogenesis
- incubation 9-10 days
- oral; fecal and/or urine contamination of food
- no evidence of eleph to eleph transmission
- subclinical infections possible
- replicates in myocardial cells and kills them

Clinical Signs in Elephants
- sudden death
- anorexia, lethargy
- +/- respiratory signs
- subclinical infection possible
- recovered animals +/- weak hearts / future anesthesia risk

Diagnosis
- antemortem dx rare due to rapid clinical course
- gross lesions: pale streaks in the myocardium, hydrothorax; hydropericardium; pulmonary edema; froth in tracheobronchial tree
- histopath: myocardial degeneration and necrosis with lymphocytic infiltrates
- virus particles may be visible on electron microscopy
- definitive diagnosis: virus isolation, PCR, mouse inoculation
- serological test for antibodies available – Texas A&M

Differential diagnosis
- herpes virus
• hypovitaminosis E
• cardioactive glycoside plant poisoning (oleander)

Management
• no specific treatment
• prevention by rodent control is crucial
• vaccine available in South Africa
• commercial pig vaccine in U.S.
• experimental elephant vaccines in U.S. (Dr. Kay Backues, Tulsa Zoo)
• zoos in endemic areas may vaccinate; further studies needed

Zoonotic potential
• humans susceptible; sporadic cases (rare)
• laboratory workers; adolescents
• aseptic meningitis; polio-like syndrome