INFORMATION PAPER

Military Vaccine Agency
29 August 2011

SUBJECT: Rabies Infection and Rabies Vaccine

1. Purpose. To describe rabies and the vaccine to prevent it.

2. Facts.

a. Microbiology. Rabies is a zoonotic disease caused by a RNA virus of the Lyssavirus genus, family Rhabdoviridae. Rabies virus infects the central nervous system, causing swelling of the brain (encephalopathy) and eventually death.

b. Disease. Early symptoms of rabies in humans are nonspecific, consisting of apprehension, fever, headache, and general malaise. As the disease progresses, neurological symptoms appear and may include insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, excessive salivation, difficulty swallowing (which gave rise to the term “hydrophobia,” fear of water). Delirium and convulsions often follow. Death usually occurs within days of the onset of symptoms.

c. Epidemiology. Rabies is a preventable viral disease of mammals most often transmitted through the bite of a rabid animal. Most reported rabies cases occur in wild animals like raccoons, skunks, bats, and foxes. Rabies cases in domestic animals account for less than 10%. Worldwide, most human deaths attributed to rabies are caused by dog bites.

d. Vaccine. Two licensed rabies vaccines for humans are distributed in the United States: *Imovax Rabies* and *RabAvert*. Each is a freeze-dried suspension of inactivated rabies virus that contains no preservative and should be used promptly after reconstitution. *Imovax Rabies* is distributed by Aventis Pasteur, licensed in 1980. The product is produced in cultures of human diploid cells, leading to its abbreviation as HDCV vaccine. *RabVert* is distributed by Chiron, licensed in 1997. The product is produced in cultures of purified chick embryo cells (PCEC).

e. Cautions. In view of the almost invariably fatal outcome of rabies, there is no restriction to post-exposure immunization. Observe the patient for vaccine adverse events if he or she is known to be sensitive to processed bovine gelatin, chicken protein, albumin, neomycin, chlortetracycline, or amphotericin B.

f. Immunization.

(1) Pre-exposure prophylaxis. Administer three 1-mL doses of vaccine intramuscularly (IM) in the deltoid muscle, one each on days 0, 7 and 21 or 28.

(2) Post-exposure prophylaxis, previously vaccinated. Previously vaccinated persons are those who have received one of the ACIP-recommended pre- or post-exposure prophylaxis regimens (with cell-culture vaccines) or those who received another vaccine regimen (or vaccines other than cell-culture vaccine) and had a documented adequate rabies virus-neutralizing antibody response. Previously vaccinated persons, as defined above, should receive 2 vaccine doses (1.0 mL each in the deltoid), the first dose immediately and the second dose 3 days later. Administration of HRIG is unnecessary, and HRIG should not be administered to previously vaccinated persons to avoid possible inhibition of the relative strength or rapidity of an expected anamnestic response.

(3) Post-exposure prophylaxis, unvaccinated. Administer HRIG and one dose each of rabies vaccine on day 0, 3, 7, 14 (four vaccine doses total) intramuscularly (IM) in the deltoid muscle. HRIG is administered once to previously unvaccinated persons to provide rabies virus-neutralizing antibody coverage until the patient responds to vaccination by actively producing virus-neutralizing antibodies. HRIG is administered once on day 0 at the time PEP is initiated, in conjunction with human rabies vaccine. If HRIG was not administered when vaccination was begun on day 0, it can be administered up to and including day 7 of the PEP series. If anatomically feasible, the full dose of HRIG is infiltrated around and into any wounds. Any remaining volume is injected intramuscularly at a site distant from vaccine administration. HRIG is not administered in the same syringe or at the same anatomic site as the first vaccine dose. However, subsequent doses (i.e., on days 3, 7, and 14) of vaccine in the 4-dose vaccine series can be administered in the same anatomic location in which HRIG was administered.

g. Adverse Events. Rabies immunization results in the typical pattern of injection-site reactions (e.g., pain, redness and swelling) and systemic effects (e.g., headache, fever, dizziness, and gastrointestinal symptoms). Rare serious allergic reactions have occurred.

h. DoD Policy. Administer rabies vaccine to personnel with a high risk of exposure (e.g., animal handlers; certain laboratory, field, and security personnel; personnel frequently exposed to potentially rabid animals in a non-occupational or recreational setting) in accordance with current ACIP and yellow book recommendations. Consider vaccination for special-operations personnel who may operate away from reliable medical resources for prolonged intervals.

i. Special Considerations. To help prevent rabies, thoroughly wash all bite wounds and scratches with soap, water, and a virus-killing agent such as providone-iodine solution. In studies of animals, thorough wound cleansing alone without other post-exposure prophylaxis markedly reduces the likelihood of rabies transmission.

3. References.

a. Centers for Disease Control and Prevention. Human Rabies Prevention —

United States, 2008 Recommendations of the Advisory Committee on Immunization Practices. MMWR 2008;57(No. RR-3):1-28.

b. Centers for Disease Control and Prevention. Use of a Reduced (4-dose) Vaccine Schedule for Postexposure Prophylaxis to Prevent Human Rabies. Recommendations of the Advisory Committee on Immunization Practices. MMWR 2010: 59(No.RR-2): 1-9.

c. Multiple resources (e.g., product insert, Vaccine Information Statements) assembled by Military Vaccine Agency: www.vaccines.mil/rabies

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