

# Horse Flies: Identification, Bite Reactions, and Clinical Management

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## PRACTICE POINTS

- Horse flies (Tabanidae) are hematophagous insects that can cause minor cutaneous reactions (eg, urticaria) or, rarely, severe reactions such as anaphylaxis. They also are vectors of tularemia, which may manifest with cutaneous ulcers or systemic illness.
- Mild reactions are managed symptomatically; anaphylaxis requires epinephrine, and tularemia requires systemic antibiotics such as gentamicin.
- Patients should be counseled on avoidance strategies, including wearing protective clothing and using topical repellents and environmental traps.

Horse flies are common dipteran insects that can be found in most parts of the world. They feed on the blood of their hosts, including humans. Female horse flies pierce the skin of the host, inject anticoagulant saliva, and suck the blood, which can result in minor cutaneous reactions (eg, urticaria, papules localized to the bite site). In severe cases, bites also can result in anaphylaxis. Horse flies can transmit tularemia, which typically manifests as cutaneous ulcers and lymphadenopathy but also can result in severe systemic reactions such as septic shock. Minor cutaneous reactions can be treated with symptomatic management and oral antihistamines, while anaphylaxis and tularemia require systemic therapy with intramuscular epinephrine and intravenous gentamicin, respectively. Exposure to horse flies can be minimized via use of protective clothing, topical repellants, and traps.

Horse flies (Tabanidae) are hematophagous dipteran insects that feed on the blood of their hosts, including humans.<sup>1</sup> Their bites can cause minor cutaneous reactions (eg, urticaria) or, rarely, severe reactions such as anaphylaxis. They also are vectors of tularemia, which may manifest with cutaneous ulcers and systemic illness. In this article, we discuss identifying features of horse flies as well as clinical manifestations from bite reactions, symptomatic and emergency management, and strategies for prevention and control.

## Morphology and Geographic Distribution

Horse flies, which can grow as large as 30 mm, can be identified by their brown or black bodies and characteristic large heads and proboscises, wing venation, large calyp- ters, pulvilliform empodium between large pulvilli, and lack of bristles on the body.<sup>2</sup> Occasionally, their bodies may be gray, yellow, green, or blue, but this is less likely than in the other species of the Tabanidae family. Short hairs are present on the head and thorax. The eyes are large and often patterned, multicolored, and bright, though they also can exhibit shades of dark brown, gray, or black. There is variation in the appearance of male vs female horse flies: females have eyes that are widely spaced apart, while males have eyes that are closer together.<sup>2</sup> It is important to note the difference between male and female horseflies, as hematophagy is exhibited only by females.<sup>1</sup>

Horse flies are found worldwide, with the exception of Hawaii, Greenland, and Iceland.<sup>3,4</sup> They are especially prevalent in warm and moist regions, as these conditions are optimal for breeding.<sup>3-5</sup> They tend to be active during the day and inactive at night due to a preference for sunlight and warmth.<sup>6</sup> Due to this preference, horse flies' seasonal activity depends on the climate; for many regions, activity persists from summer to early autumn.<sup>7</sup>

## Clinical Manifestations and Treatment

Female horse flies use their mouthparts to pierce the host's skin, inject saliva, and suck blood. The saliva contains anticoagulant properties. The bites are painful for the host, and various reactions can occur, including large urticarial wheals or papules at the site of the bite. Treatment for these minor cutaneous reactions is largely symptomatic. The bite site should be washed with soap and water; ice can be applied to help reduce inflammation.<sup>8</sup> Oral antihistamines may be administered to reduce pruritus and treat urticaria. Topical steroids also can be prescribed for symptomatic relief. Acetaminophen and nonsteroidal anti-inflammatory drugs can be administered for pain control.<sup>8</sup>

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While most cases of horse fly bites are minor, there have been reports of anaphylaxis.<sup>9</sup> Horse fly bite-induced anaphylaxis can manifest as generalized itching, urticaria, and angioedema within minutes of being bitten. This may be followed by pharyngeal constriction, shortness of breath, nausea, vomiting, shivers, perspiration, and loss of consciousness.<sup>9</sup> Anaphylaxis symptoms should be treated with immediate administration of intramuscular epinephrine.<sup>10</sup>

### Pathogen Transmission, Prevention, and Control

Although horse flies have been found to carry numerous viruses, bacteria, and protozoa that affect other mammals, there is not enough evidence to suggest that they are vectors of transmission for humans for most diseases.<sup>11,12</sup> In particular, West Nile virus and *Borrelia burgdorferi* both have been found in horse flies, but there are no reports of transmission of these diseases to humans through their bites.<sup>12</sup>

Horse flies, their close cousins deer flies (specifically *Chrysops discalis*), and ticks are known vectors of *Francisella tularensis*.<sup>13</sup> These bacteria cause tularemia, which can manifest with symptoms such as fever, headache, and malaise. Ulceroglandular tularemia is the most common manifestation, in which the patient develops a cutaneous ulceration at the site of the horse fly bite and exhibits associated tender regional lymphadenopathy.<sup>14</sup> Exudative conjunctivitis, exudative pharyngitis, abdominal pain, diarrhea, vomiting, and severe bilateral pneumonia also are common symptoms. The most severe form of tularemia is systemic or typhoidal tularemia, which can manifest with fever, septic shock, and hepatosplenomegaly.<sup>14</sup> The current treatment of choice for all forms of tularemia is intravenous gentamicin, with a recommended dosage of 5 mg/kg/d for 7 to 14 days; streptomycin is an acceptable alternative.<sup>14-16</sup> Ciprofloxacin is used less commonly and is reserved for milder disease. Incision and drainage of the affected lymph nodes also may be necessary.<sup>14</sup> It is important to promptly identify and treat tularemia, as the mortality rate can be as high as 50% for untreated disease, especially in patients with systemic symptoms. Even after treatment, many patients exhibit residual scarring at the site of the ulcer, as well as lung, kidney, and muscle damage.<sup>14</sup>

It is advised to avoid contact with horse flies due to the range of symptom severity caused by their bites, but avoidance and control can be difficult. Malaise traps, consisting of a tent and polyester netting, can be used to capture the insects.<sup>17</sup> Octenol has been shown to be effective for attracting horse flies and can be applied to the trap in order to increase its effectiveness.<sup>18</sup> A Manitoba horse fly trap is a modified version of the Malaise trap that contains a suspended dark sphere to further attract horse flies.<sup>19</sup> Patients also should be instructed to wear long-sleeved shirts and pants when outdoors in areas with horse flies to avoid contact, and application of DEET (N,N-diethyl-meta-toluamide), picaridin, citronella, or geraniol-based repellents also can be effective in reducing exposure.<sup>20</sup>

### Final Thoughts

Horse flies are large, blood-feeding dipteran insects whose bites usually produce painful local reactions. Although most bites are benign, they rarely can cause anaphylaxis, and certain Tabanidae insects can transmit *Francisella tularensis*; therefore, clinicians should consider the risk for tularemia infection in patients presenting with horse fly bites and start appropriate antibiotic therapy when indicated. Due to the risks, prevention of bites and reduction of contact with horse flies via protective clothing, repellents, and trapping methods is recommended. Patients should be advised on bite care and to seek urgent care for systemic symptoms or rapidly progressive local signs.

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