Cutaneous Larva Migrans and Myiasis

Terry L Dwelle MD MPHTM
► Cutaneous Larva Migrans (Creeping Eruption) is a cutaneous eruption resulting from exposure of the skin to infective filariform larvae of non-human hookworms and Strongyloides.

► Occurs in most warm humid tropical and subtropical areas (eg South USA along the coasts, coasts of West, South and East Africa, South-East Asia, India, Malaysia, Sri Lanka and Thialand
Etiology - CLM

► Hookworms - CLM
  - Ankylostoma caninum (dog)
  - Ankylostoma braziliense (dog, cat) – most common
  - Urcinaria stenocephala (European dogs)
  - Bunostoma phlebotomun (cattle)

► Strongyloides – CLM
  - S pyoncyonis (raccoon)
  - S myoptami (nutrea)
  - ? Pelodara

► Gnathostoma spinergium (dog, cat)

► Others
  - Loa Loa (Calabar swelling)
  - Fasciola hepatic (ectopic migration)
Clinical - CLM

- There is no protective immunity from a prior infection
- Larvae generally wander under the skin for months before they eventually die
- Symptoms start immediately after penetration of the skin
- Generally there is an erythematous papule at the entry site which often becomes a vesicle
- The larvae generally move a few mm – cm’s per day leaving tunnels that become dry and crusted
- The track can be linear but also twists and turns
- Causes intense pruritus and may become secondarily infected
- Generally there is little flare surrounding the indurated track
- Strongyloides pyocyonis and myoptami clinically present as described. Strongyloides stercoralis causes tracks that are less defined, have a red flare, move more rapidly (10 cm per hour) and persist for only a few hours. This is not called CLM but larva currens.
<table>
<thead>
<tr>
<th>Drug</th>
<th>Adult dosage</th>
<th>Pediatric dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albendazole (drug of choice)</td>
<td>400 mg daily X 3 days</td>
<td>400 mg daily X 3 days</td>
</tr>
<tr>
<td>Ivermectin (drug of choice)</td>
<td>200 ug / kg daily X 1-2 days</td>
<td>200 ug / kg daily X 1-2 days</td>
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<tr>
<td>Thiabendazole (alternate)</td>
<td>Topically (generally daily for 5 days)</td>
<td>Topically (generally daily for 5 days)</td>
</tr>
</tbody>
</table>

Medical Letter, August 2004, Drugs for Parasitic Infections.
<table>
<thead>
<tr>
<th>Drug</th>
<th>Adverse Reactions</th>
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</thead>
</table>
| Albendazole| Occasional: diarrhea, abdominal pain  
Rare: leukopenia, alopecia, increased serum transaminase levels |
| Ivermectin | Occasional: eczematous skin rash, conjunctivitis  
Rare: hypotension |
| Thiabendazole | Frequent: Nausea, vomiting, vertigo  
Occasional: Leukopenia, crystalluria, rash, hallucinations, olfactory disturbance, erythema multiforme, Steven’s Johnson syndrome  
Rare: Shock, tinnitus, intrahepatic cholestasis, convulsions, angioneurotic edema |
Myiasis
# Myiasis

<table>
<thead>
<tr>
<th>Family</th>
<th>Subfamily</th>
<th>Genus and Species</th>
<th>Other Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calliphoridae</td>
<td>Calliphorinae</td>
<td>Metallic group</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chrysomyia bezziana</td>
<td>Old world screw worm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Callitroga hominivorax</td>
<td>New world screw worm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lucilia spp</td>
<td>Green bottles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Calliphora</td>
<td>Blue bottles</td>
</tr>
<tr>
<td></td>
<td>Non - metallic group</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Auchmeromyia luteola</td>
<td></td>
<td>Congo floor maggot</td>
</tr>
<tr>
<td></td>
<td>Cordylobia anthropophaga</td>
<td></td>
<td>Tumbu or mango fly</td>
</tr>
<tr>
<td></td>
<td>Sarcophaginae</td>
<td>Wohlfahrtia spp</td>
<td>Flesh fly</td>
</tr>
<tr>
<td></td>
<td>Sarcophaga</td>
<td></td>
<td>Flesh fly</td>
</tr>
<tr>
<td>Oestridae</td>
<td></td>
<td>Dermatobia hominis</td>
<td>Human bot fly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hypoderma spp</td>
<td>Larva migrans</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gastrophilus spp</td>
<td>Larva migrans</td>
</tr>
</tbody>
</table>
Myiasis is caused when fly larvae invade living tissues or when they are harbored in the intestine or bladder.
Myiasis

There are 3 categories of myiasis producing flies

- Obligatory – Larvae must develop in living tissues
- Facultative – Larvae usually develop on carrion but can invade wounds
- Accidental – Larvae or eggs are accidentally ingested and are not killed in the intestine
Myiasis

Maggots may attack 3 parts of the body

- Cutaneous tissues – invade sores, wounds, burrow in the skin, suck blood
- Body cavities – nose, mouth, ears, orbit, anus, vagina
- Gastrointestinal lumen – fly eggs / larvae pass through the stomach and bowel and emerge in the stool
Myiasis – Nose and Ears

- Nasal and ear myiasis is caused by Chrysomyia, Oestrus, Rhinoestrus, and Callitroga flies. The flies lay eggs in the nasal cavity particularly where there is chronic nasal discharge. The larvae burrow into tissues even to the nasal bone within a few hours. Symptoms include tickling, sneezing, pain and nasal obstruction followed by a purulent fetid odor and discharge. Can lead to local destruction of bone and cartilage, and even migrate to the brain. Mortality with Callitroga hominivorax is 8%. Treatment is with a few drops of 15% chloroform in light vegetable oil which causes them to emerge where they can be removed. Control – large scale release of male flies sterilized by gamma radiation.
Myiasis - Eye

- Eye myiasis or ophthalmomyiasis may be external caused by Oestrus and Wohlfahrtia spp causing conjunctivitis only.
- Internal ophthalmomyiasis is caused by Dermatobia, Oestrus, Gasterophilus and Hypoderma. Oestrus mainly causes conjunctivitis. The female fly strikes the eye and instantaneously deposits eggs. Larvae develop which cause conjuntivitis or invade the eye and can be incredibly destructive.
Myiasis – Anus and Vagina

- Myiasis of the Anus and Vagina is caused mainly by Wohlfahrtia. Eggs are laid around the anus and vagina of adults and children in poor hygienic conditions particularly where there is soiling or sores. Large numbers of maggots can develop in a few hours.
Myiasis - Wound

- Wound myiasis is caused by both obligatory and facultative flies including Calliphora, Lucilia, Phormia, Musca, Fannia, Wohlfahrtia, Chrysomyia, and Callitroga. The larvae of these flies live in moist folds of skin and enter sores and wounds. In some instances these maggots are used to debride wounds of dead material where antibiotics and surgery are impractical.
Myiasis - Urogenital

- Urogenital Myiasis is rare and caused by larvae infecting the vagina or vulva area penetrating the urethra and entering the bladder. Most of these infections are caused by Psychoda, Musca, Calliphora and Sarcophaga.
Myiasis - Gastrointestinal

- Gastrointestinal lumen - Eggs and sometimes larvae are deposited on food and occasionally survive the transit through the stomach. They then develop in the folds of the mucous membranes causing pain, vomiting, diarrhea and occasionally ulcers. This infestation may persist for months. Occasionally larvae may be seen in feces or vomitus. The usual flies associated with intestinal myiasis are Musca, Fannia, Chrysomyia, Calliphora, and Lucilia. Covering of food is preventive. Treatment with purgatives will aid elimination and Ivermectin is occasionally worth a trial.
Etiology - Myiasis

► Cutaneous
  - Blood suckers – Congo Floor Maggot Auchmeromyia luteola
  - Subcutaneous
    - Cordylobia anthropophaga (Africa) – Tumbu, Putsi, Ver Du Cayor fly
    - Dermatobia hominis (South America) – Macaque, Berne, El Torsalo, Beefworm, Human Bot fly
  - Creeping Eruption or Dermal Myiasis – Gastrophilus, Hypoderma, Gnathostoma spinergium
Auchmeromyia luteola – Congo floor maggot

- Widely distributed in tropical Africa from sea level to 2250 m in both dry and wet climates
- Orange buff colored blowfly
- Human feces are its most important food source
- The larva generally feeds on sleeping host
- Bite is painless. No other infections are transmitted by its bite.
- Sleeping on a raised bed prevents attacks.
- Spraying the house with residual insecticides help eliminate infestation
Cordylobia anthropophaga

- Cordylobia anthropophaga in sub-saharan Africa and S Spain
- Also called Tumbu, Putsi fly or Ver du cayor
- A large yellow brown fly
- Eggs are laid on sandy ground contaminated with feces and urine or washed clothing. Larvae emerge and invade subcutaneous tissues and develop over 8-12 days. They emerge fall to the ground pupate and hatch as adults in 10-20 days.
- Most commonly involves the back, head and neck
- Most common in children
Cordylobia anthropophaga

► Lesion
  - Starts as a papule which can be pruritic
  - Serous exudate is common
  - Lymphadenopathy is occasionally seen
  - Can see fever and malaise
  - Resembles an abscess
  - Respiratory spicule is seen but retracts when touched

► Diagnosis
  - Little pain vs a boil
  - Spiracles present
  - Cover with vaseline, glycerin or oil – diagnostic bubbles

► Treatment
  - Cover with oil
  - Pop out like a pimple
Cordylobia anthropophaga

► Prevention

- All clothing and towels should be ironed on both sides
- Drip dry clothing hung indoors with the windows closed to prevent contact with flies
Dermatobia hominis

- Widely distributed in Central and South America
- Attacks a wide range of host including livestock
- Bluish gray fly
- Fly lays eggs on other insects particularly mosquitoes. These eggs hitchhike to the host on these other insect’s bellys. On feeling warmth rapidly hatch and penetrate the skin (5-10 minutes). Larvae develop in 6-12 weeks, drop from the skin to the ground, pupate and hatch as adults.

- Lesion
  - Develop into a small nodule with a central pore (air hole)
  - Can be multiple
  - Inflamed swelling of 2-3 cm
  - Spiricles can be seen from the air hole
  - Exudate of seropurulent fluid and dark feces of the larva
  - Painful and prurritic
  - Do not suppurate due to bacteriostatic action the gut of the larva
Dermatobia hominis

► Diagnosis
  - Characteristic spiracles and fecal stained serous exudate

► Treatment
  - Occasionaly can be removed like Cordylobia anthropophaga
  - Generally requires surgical removal
  - Care must be taken not to leave portions of the larvae in the wound

► Complications
  - Loss of eye
  - Fatal cerebral myiasis in children - rare

► Control
  - Insecticides
  - Sterilizing male insects with radiation
Gastrophilus and Hypoderma—Creeping Eruption

- Common parasites of horses (Gastrophilus) and cattle (Hypoderma ovis and lineatum)
- Eggs are deposited on hair or grasses. The larvae hatch (eg 1 week in Hypoderma) and penetrate the skin on contact.
- Larvae do not develop beyond the instar stage
- Cause swelling and a creeping eruption in the lower dermis
- Hypoderma penetrates deeper than Gastrophilus and has been reported to invade the nervous system
Clinical Features

- Tunnels of Gastrophilus mimic CLM
- Pruritus
- Hypoderma produce deeper swellings that resemble an abscess
- Migrate for considerable distances
- Hypoderma ovis has been associated with CNS invasion
Diagnosis

Gastrophilus larvae can be identified by putting a small amount of clear mineral oil over a lesion. The larvae can then be identified by the black transverse bands of spines on the body.
Treatment

- *Gastrophilus larvae* – needle
- *Hypoderma* – cruciform incision