

Timeline following inoculation with hookworm

Timeline overview

Day 1

Localised skin reaction (rash) may occur and can continue, often intermittently, until 21 days. Benadryl cream or a topical steroid preparation gives the most relief. Some have also reported relief after applying honey or seawater.

Days 3-5

Larvae migrate via the lungs to the intestines. Side effects can occur on or after the 4th day and may include coughing, respiratory symptoms (which can occur up to 28 days), rash flare-up, fatigue, diarrhoea, cramping, 'gas', nausea and vomiting. Side effect severity is dose-dependent and varies widely from person to person.

Days 6-14

The worms mature in the intestines, and this may cause a 'bounce' - a sudden improvement in symptoms, causing subjects to feel unusually well. Starting about three or four days after infection with hookworm, and lasting for up to two weeks, there may be a profound remission of symptoms (Crohn's, allergies, etc.) and also experience a strong sense of calm, focus, happiness and lightheartedness, but this won't last, so don't stop taking any medications at this point!

Weeks 3-10

The worms attach to the inner wall of the intestine towards the end of week 3. There may be fatigue and gastrointestinal symptoms continuing - often intermittently - from 29-70 days (correlating with the period of elevated eosinophil counts which can result in an eosinophilic gastroenteritis), and peaking at about 50 days, then gradually diminishing.

Immodium or Pepto Bismol will treat the diarrhoea, but, if the symptoms are really bad, subjects should ask their doctor for a short course of antihistamine or prednis(ol)one (a corticosteroid medication). These have been found to be very helpful in combatting the side effects generally, and a short course of steroids immediately following inoculation is highly recommended for those who know they have an intestinal stricture. This will obviate the possibility of any localised inflammation making a stricture worse.

Anyone reaching day 23 without experiencing significant symptoms will almost certainly be in the clear. If, however, diarrhoea or fatigue persist for three days or more then prednis(ol)one may be appropriate, and this could be continued for a week, followed by a taper agreed by a doctor.

Allergies may get somewhat worse in the first 4-5 weeks, due to an increased inflammatory reaction, before usually improving after this.

Worms begin producing eggs between weeks 6 and 8, and, although egg output may remain low for several more weeks, some hosts have reported that they experienced the start of long-lasting improvement at 7 or 8 weeks.

Weeks 12-20

Although some hosts have reported experiencing the start of long-lasting improvement at 7 or 8 weeks, the worms only really start to 'work', and symptoms begin to ease, at around 12 weeks. Allergies and asthma, in particular, generally (but not always) resolve between the 11th and 13th weeks. By week 20, the worms are usually in their stride.

Week 45

The worms and body reach equilibrium. Any improvements that are going to result from the presence of the worms will usually have occurred by this time, although, in just a few cases, improvements may not materialise until as late as 14 months.

The timeline in more detail

Day one, inoculation

Some people experience an itch and/or a pink rash that can be raised but is limited to the site of inoculation. This is caused by the immune reaction in the skin to entry by the worms. Some subjects get nothing except a faint pink mark with or without red dots. Others get an itch but no rash, and some get nothing at all. When it does occur, the rash can be very itchy, and scratching can often occur during sleep. A single application of Benadryl lotion with an alcohol base can alleviate even a severe itch for several hours. Cortisone cream is another alternative, and anything, either topical or oral, that treats allergies or itchy rashes should work to varying degrees.

As the host's immune system 'learns' about worms, the skin reaction (and likely the reactions in the intestines) may increase in severity, in some individuals, with each successive inoculation, at least for the first few doses. Once the hookworm start exerting their anti-inflammatory effect, due to the molecules they secrete to modulate the immune system, the skin reaction may gradually lessen. Thus, while the second and third inoculations can cause successively stronger rashes, the fourth and fifth may be progressively milder, though not always.

When trying helminthic therapy for the first time, it is easy to obsess about the process, to wonder whether the treatment has 'taken', and to ascribe every tick and sniffle that develops in the first few days, post inoculation, to the helminths. This obsession is natural, but it is important to remember that one's body continues to operate largely as usual in the early stages of a helminthic infection. One still gets colds and food poisoning, etc., and any physical changes experienced by new helminth hosts are far more likely to be manifestations of normal bodily functions than the action of the helminths. The latter follow a natural progression determined by evolution over millions of years, which is largely hidden from immediate experience.

Days 3-5

Having migrated from the skin, via the bloodstream, to the lungs, during the first two days, the still-invisible larvae then burrow through the lining of the lungs to join all the particulate matter - dust, smoke particles, pollen, etc. - being swept up along the 'escalator' of hairs that lines the inside surface of the lungs. This ciliary conveyor belt eventually transports the larvae to the throat, where they transfer from the airway to the gullet before continuing on their journey down to the stomach and on to the lower intestine, where they will spend the remainder of their three to seven year life span (average 5 years).

Occasionally, the migration of the larvae through the lungs may make some people cough, though this dose-related effect is actually quite rare. Coughing up phlegm and/or spitting should be resisted from days 2-5 to avoid expelling larvae that might be passing through the throat at the time, on their way from the lungs to the gastrointestinal tract.

Similarly, anyone who practices neti (nasal irrigation) should temporarily suspend the practice between days 2 and 5. If it is absolutely necessary to use nasal irrigation, then this should be done by passing saline solution from one nostril to the other rather than by drawing it into one or both nostrils then expelling it via the mouth, which could obviously wash away any larvae that might be traversing the throat.

Common side effects at this stage are, in descending order of occurrence: a flare of the skin rash at the site of inoculation, fatigue, diarrhoea, cramping and gas, nausea and vomiting. Children may display behavioral changes akin to those seen in a child with flu or allergies - lethargy, crankiness, etc.

Day 6 to end of Week 2

Typically, not much happens during this period, unless it is a continuation of symptoms that started within the first few days. The only change that may occur is a possible 'bounce'. This is a fairly unusual phenomenon observed in some subjects but not described in the literature.

The 'bounce' is a period in which all the subject's usual symptoms (Crohn's, asthma, allergies, etc.) disappear, sometimes completely. It typically occurs around the end of week one, perhaps as early as day five and even as late as week two. It can last about a week, but may appear for only 3-4 days, or, rarely, last for almost two weeks. Often this cessation of symptoms is accompanied by a wonderful feeling of calm, serenity, well-being and happiness.

It is easy to take a 'bounce' as evidence that the worms have 'worked' and that all will be well from this point on. Unfortunately, the 'bounce' never lasts, so one should not suddenly abandon whatever medications one is taking, or the diet one is following! This phenomenon is only temporary and not an indication that one has achieved remission in record time.

The appearance of a 'bounce' may be due to the fact that the body suddenly finds it has an appropriate target at which to aim its immune artillery. Alternatively, it may be due to something that the larvae are doing that elicits a strong response that quells inflammation. Either way, the 'bounce' is something to be enjoyed... while it lasts.

Week 3 to week 10

The hookworm moult and become adults after reaching the intestines, and attach to the intestinal wall towards the end of week 3. Their eventual home is usually the lower reaches of the small intestine, unless this has been surgically removed, or an individual has hundreds of worms.

Side effects at this stage can include, in order of occurrence: fatigue, cramping, bloating, gas, epigastric pain (stomach ache all over the abdomen), diarrhoea, nausea, and a recurrence of the skin rash. A few people have reported constipation.

For those individuals who get gastrointestinal side effects, these are most likely to occur around day 21, as a result of the body's attempt to expel the worms by deploying eosinophils - white blood cells that attack helminths - to cause eosinophilic enteritis. In most people, this inflammatory response translates to a few days of loose bowel movements or diarrhoea, perhaps accompanied by fatigue. A few people may get prolonged gastrointestinal symptoms continuing for many weeks, even into the low 20s, but it always resolves eventually, without treatment, and with no harm done.

The severity of the side effects varies enormously from person to person. Only a small percentage - perhaps five percent - experience stronger side effects, including pronounced diarrhoea and cramping due to gas, which can be spectacularly bad and has been described as 'toxic', 'industrial' or 'otherworldly'. Rarer still are fever, night sweats and joint pain. For those suffering the worst side effects, even if it is only a few percent of those who try the therapy, the effect is such that study or work would be very difficult.

All the side effects except the skin rash normally reduce sequentially with successive doses. One individual, who had many weeks of diarrhoea following the first hookworm dose, found his symptoms greatly reduced the second time around and, after the third dose, there was no liquid diarrhoea at all during the side effect period, just very soft stools with a 'cow pat' consistency. After the fourth dose, his stools were virtually as normal, but remained slightly softer than they had been prior to infection.

The skin rash at the inoculation site may also recur during the gastrointestinal side effect phase, perhaps because the worms shed cells and debris from their skin as they migrate through the host's skin, and, when the worms attach and put the same kind of material (their skin) into contact with the host's immune system in the intestines, the host's immune system releases antibodies to those types of cells or proteins wherever they occur, whether in the intestine or in the skin.

Strangely, the first few hookworm doses produce a successively more pronounced skin rash, with the fourth or fifth inoculation leaving some people with a very impressive 'love bite', perhaps even surrounded by a halo of apparently bruised skin which can become raised and may be as itchy as the rash site itself.

Apart from the skin rash, which tends to ease after a few days, all the other side effects typically come and go, and the experience can be very much like riding a roller-coaster. There is also enormous variation between individuals, with some people getting no symptoms at all, and others experiencing relentless fatigue, disabling abdominal pain and geysers of diarrhoea.

It is worth remembering that hosting worms doesn't stop one succumbing to all the usual infections, stomach upsets, etc., to which man is heir, so, when symptoms emerge, these may not be due to the helminths.

Treating the side effects

Only in the most severe cases is it necessary to terminate a hookworm infection and switch to a protocol involving several smaller doses, which oftentimes eliminates or avoids all but the mildest side effects. Alternatively, in severe cases, the side effects can be quelled completely with a daily dose of 20 mg prednis(ol)one.

20 mg of this drug, taken in the morning, will so profoundly suppress the immune response to hookworm (or whipworm) that those who are taking this amount of prednis(ol)one as therapy for their disease will invariably show none of the symptoms of successful hookworm infection and be convinced that the infection was not successful.

So, anyone who is worried about the side effects, should ask their doctor for a prescription for some prednis(ol)one and keep this on hand to suppress the side effects in the unlikely event that they occur. As it should only be needed for a short time, there would be no long term adverse consequences of taking this drug.

Low dose Naltrexone also looks promising as a means of offsetting symptoms during this side-effect phase, and diarrhoea usually responds well to a standard diarrhoea relief preparation such as loperamide.

As all the side effects are related to inflammation, anything that one can use to reduce inflammation could potentially help. The side effect mechanism is very similar to allergies, so antihistamines may help and many subjects have reported good results with oral benadryl or loratadine (e.g., Claritin), and with benadryl cream applied topically for the rash.

In theory, ibuprofen should work well, as it is an anti-inflammatory, but, in practice, it is unlikely to help and may even make things worse. Like Naprosen, and other NSAIDs, ibuprofen is notorious for being hard on the stomach and gut. Paracetamol might be better.

Of course none of this is medical advice, and drugs like prednis(ol)one are serious prescription-only medications that should only be used with the guidance of a doctor.

Week 12 to week 20

Once a therapeutic dose of hookworm is achieved, they usually start to work - if they are going to work at all - between week 12 and 20, though this really does vary enormously depending on the disease being treated.

11 months and beyond

Most people can expect to see benefit by 12-20 weeks, then, between six and twelve months, the immune system adjusts to the presence of hookworm to the point where the good they do may diminish somewhat. For some people, this means that they fall out of full remission or require continued medication to maintain it, albeit at a lower level than pre-hookworm.

Beyond this period of drop-off, things get better again, until a final equilibrium is achieved. For some, this may be reached at 11 months after their last dose of hookworm, while, for a few, this may take until approximately 15 months. This means that some will only get temporary and brief benefit from hookworm in the early stages, with complete remission taking up to 18 months, and a few may notice a subtle continuation of benefit for several years.

There is, however, always the qualifier that, in approximately 20% of cases, hookworm may never work at all.

Eventually, efficacy will decline as the worms age. This may not be for 3, 4, 5, or even more years, but it is possible for efficacy to decline earlier than this, especially in a small sub-group of individuals with Crohn's disease or one of a few other specific conditions. For these few, efficacy can decline as early as five months, while, for some others, it may happen when the egg output of their hookworm declines substantially at about the 12-month mark.

Whenever there is a loss of benefit from the therapy, subjects should immediately get in touch with their provider to arrange for a supplementary dose, which will usually quickly restore efficacy.

Document history

This document is an accumulation of details collected from multiple sources between 2009 and its publication in April 2012. The major part (75%) of that original material was provided by [Jasper Lawrence](#), who generously gave his permission for its use. This was supplemented by further details gleaned during conversations with Jasper, and from his posts to the [Yahoo Helminthic Therapy forum](#) and elsewhere. Additional details have been gathered from comments by numerous other individuals in posts to online groups, in blogs, and in private communications.

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