Helminthic infestations in the Tyrol, Austria

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At the federal public health laboratory, Innsbruck, 142 426 samples were examined for intestinal helminthosis from 1990 until 2000. *Enterobius vermicularis* accounted for half (49.7%) of the cases diagnosed, followed by *Taenia saginata* (28.3%), *Ascaris lumbricoides* (12.8%), and *Trichuris trichiura* (3.9%). Of all specimens tested for helminths, 26% had been positive in 1945, and 0.98% in 1985. The proportion of positive findings with respect to the total number of specimens tested was 0.24% in the time span 1990–2000. It appears to us that these numbers fairly reflect the real prevalence of helminthosis in Austria.

**Keywords**   Helminths, infestation, prevalence, Austria

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No up-to-date data on the prevalence of helminthosis in Central Europe currently exist, due to the lack of scientific studies. In Austria, only the incidence of *Echinococcus multilocularis*, certainly the most dangerous helminthozoonosis in Central Europe, and of *Toxocara canis* as well as *Toxocara catis* have been described extensively [1–4]. Serologic methods to diagnose echinococcosis and toxocarosis are available. The most commonly found helminthic infestations in Austria are those affecting humans as the final host; diagnosis is made by detecting worms, worm eggs or larvae in human samples. As the catchment area of the federal public health laboratory (FPHL) in Innsbruck has hardly changed over the past years, we felt that we were justified in including previously obtained data from our laboratory to produce an epidemiologic report on helminthosis in the population of the province of the Tyrol.

From 1990 until 2000, a total of 142 426 samples were examined micro- and macroscopically for helminthic infestations at the FPHL in Innsbruck (total number of specimens processed annually from 1990 until 2000: 11 126; 12 979; 15 312; 15 732; 13 162; 13 519; 12 974; 12 631; 12 208; 11 898; 10 882). These were received from general practitioners and from hospitals in the Tyrol (total population in 1999: 605 270). Apart from stool samples, there were worms, worm segments, cellulose tapes, anal swabs, and emesis and urine specimens. The results of serologic examinations were not taken into account [3,4].

Out of 142 426 specimens, helminths were found in 336 samples. The prevalence, without performing corrections for double infestations, was 0.24% during the aforementioned time span. Table 1 summarises the findings.

*Enterobius vermicularis*, the pinworm, is thought to be the most common human intestinal parasite in highly industrialised western hemisphere countries [5]. Also, in the Tyrol it proved to be the most prevalent intestinal helminthic infestation, accounting for half (49.7%) of the cases diagnosed.

Infestation with *Taenia saginata*, the beef tapeworm, is initiated by the ingestion of raw or poorly cooked beef (e.g. medium beef-steak) containing encysted *Taenia saginata* larvae; consumption of raw beef is not particularly common in Austria. Nevertheless, taeniosis ranked second, constituting 28.3% of the diagnosed cases. This may be due to a higher rate of sending stool specimens to laboratories compared with other helminthic infestations, and to a lower prevalence of sewage systems compared with other industrialized countries. The mountainous areas of the Tyrol often do not allow construction of sewage treatment plants or connection of buildings to public sewage systems. In 1991, 19 835 of 138 537 (14.3%) buildings were still utilising cesspools, relying on periodic dumping of human fecal material on meadows [6].

Many physicians are not aware that the drugs presently registered in Austria are not effective against taeniosis. Niclosamide, the drug of choice for the treatment of *Taenia saginata* infestations in humans, was withdrawn from the market in Austria in 1983, while praziquantel – the only other drug effective in treating taeniosis – is registered solely for administration to animals [7,8]. Since drug companies are not willing to cope with high Austrian registration fees, effective drugs have to be imported from neighboring countries for each single case. At the time of the diagnosis of taeniosis, approximately one-third of the patients have already undergone inappropriate
anthelminthic therapy (mostly mebendazole) without clinical response. While Austrian departments specialising in the treatment of tropical diseases do have short-term access to praziquantel (mainly for treatment of schistosomiasis), availability obviously poses problems to the general practitioners, those physicians confronted primarily with taeniasis patients.

We found ascariosis to be the third most prevalent helminthic infestation, accounting for 12.8% of our total cases. The real number of people in Austria carrying Ascaris lumbricoides, the roundworm, is probably second only to the number infected with Enterobius vermicularis. The geographic range of Trichuris trichiura, the whipworm, is similar to that of Ascaris lumbricoides, and often the two infections are found together in the same host. While today most of these two infestations—which depend on fecal contamination of the soil, often by the use of human feces for fertilisation of crops—are acquired abroad, some cases were diagnosed in Tyrolean patients lacking any travel history (personal observation).

Only 5.4% of the diagnoses concerned helminths other than the top four described above. Based on the World Health Organisation’s estimations, more than 1.5 billion people carry helminthic infestations (filarial infections are not included in this figure) [5]. More than half of 7,344,082 Austrians traveled abroad in 1999, and 677,600 undertook long-distance journeys [9]. With these figures in mind, it is common for almost any laboratory within Austria to occasionally recover ‘exotic’ helminth eggs, larvae, or adults from human specimens.

In Austria, helminthic infestation has been present from prehistoric times: parasitologic examinations carried out on the Iceman, the 5200–5300-year-old Neolithic glacier mummy found in the Tyrolean Oetztaler Alps in September 1991, have shown Trichuris trichiura eggs [10]. Human excrement from prehistoric salt-mines of the Hallstatt period yielded eggs of Trichuris trichiura and Ascaris lumbricoides [11]. The situation in the Tyrol is unique, insofar as, from 1945 to July 2001, only one medical microbiology laboratory was serving this closed catchment area, allowing the use of routine data for assessing the trend in helminthic disease prevalence. Using data from the FPHL in Innsbruck, Allerberger reported that of all specimens tested for helminths, a maximum of 26% were positive in 1945, when human feces were still used as crop fertiliser. In 1985, with chemical fertilisers largely supplating the agricultural use of feces, only 0.98% of the specimens tested yielded helminths [12]. The proportion of positive findings with respect to the total number of specimens tested was 0.24% in the time span that was examined. It appears to us that these numbers fairly reflect the real prevalence of helminthiasis in Austria.

**Table 1** Number of helminthic infestations diagnosed from 1990 until 2000 at the federal public health laboratory in Innsbruck (Austria)

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<tbody>
<tr>
<td>Enterobius vermicularis</td>
<td>14</td>
<td>25</td>
<td>10</td>
<td>18</td>
<td>7</td>
<td>15</td>
<td>17</td>
<td>13</td>
<td>5</td>
<td>26</td>
<td>17</td>
<td>167 (49.7)</td>
</tr>
<tr>
<td>Taenia saginata</td>
<td>10</td>
<td>13</td>
<td>11</td>
<td>12</td>
<td>8</td>
<td>8</td>
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<td>7</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>95 (28.3)</td>
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<tr>
<td>Ascaris lumbricoides</td>
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<td>4</td>
<td>11</td>
<td>5</td>
<td>4</td>
<td>1</td>
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<td>4</td>
<td>3</td>
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<td>43 (12.8)</td>
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<tr>
<td>Trichuris trichiura</td>
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<td>–</td>
<td>5</td>
<td>4</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>13 (3.9)</td>
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<tr>
<td>Hymenolepis nana</td>
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<td>2</td>
<td>1</td>
<td>–</td>
<td>–</td>
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<td>–</td>
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<td>3 (0.9)</td>
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<td>–</td>
<td>1</td>
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<td>–</td>
<td>–</td>
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<td>1</td>
<td>–</td>
<td>3 (0.9)</td>
</tr>
<tr>
<td>Heterophyes heterophyes</td>
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<td>–</td>
<td>3</td>
<td>–</td>
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<td>–</td>
<td>3 (0.9)</td>
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<td>Diphyllolothrium latum</td>
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<td>–</td>
<td>–</td>
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<td>–</td>
<td>1</td>
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<td>–</td>
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<td>–</td>
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<tr>
<td>Total</td>
<td>40</td>
<td>42</td>
<td>43</td>
<td>41</td>
<td>19</td>
<td>27</td>
<td>21</td>
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REFERENCES

Unusual etiology of visual loss in an HIV-infected patient due to endogenous endophthalmitis

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Disseminated candidiasis, especially ocular infections such as endophthalmitis, is uncommon in HIV-infected patients. We report a case of candidal endophthalmitis in an HIV-positive non-drug-user patient, following candidemia from a cutaneous abscess at the site of a peripheral catheter. Ocular disease was revealed by a visual decrease in the left eye. DNA analysis using RAPD showed identical patterns of Candida albicans isolated from the skin and eye. Combination therapy with high-dose fluconazole and intravenous amphotericin B was performed. Two intravitreal amphotericin B injections and a vitrectomy were administered because of an amblyopic right eye and severe vitritis. The outcome was favorable without relapse at 18 months.

Keywords Endophthalmitis, candidal infection, HIV

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CASE REPORT

A 31-year-old heterosexual man, found to be positive for HIV in November 1996, was admitted in February 1997 after a 1-day history of sudden blurred vision in the left eye. He was admitted to hospital for the first time in November 1996 with a 1-month history of fever (38–38.5 °C), a cough, a 5-kg weight loss, and sweating at night. Bacterial sinusitis and pneumonia caused by Streptococcus pneumoniae and Haemophilus influenzae were diagnosed. Both isolates were susceptible to amoxicillin. A severe HIV-related immunocompromised state was subsequently established (CD4 cell count, 11/mm3; HIV-1 viral load, 6.1 log10). He initially improved with intravenous amoxicillin (6 g daily) and was considered cured after 15 days of treatment. Three days later his fever relapsed (39 °C). Blood and maxillary sinus culture yielded S. pneumoniae, with an antibiotic similar to the first one. Pseudomonas aeruginosa was also found in the sinus. Despite prolonged intravenous therapy with vancomycin, cefazidine and ciprofloxacin, fever persisted for 15 days. During this period, various abnormalities appeared, such as prolonged pancytopenia (>15 days) with severe neutropenia (neutrophil count, <100/mm3) and thrombocytopenia (platelet count, 11 000/mm3) associated with cytolysis, hyperferritineemia and hypertriglyceridemia. No opportunistic infection or tumor-associated event was found. Two bone-marrow punctures revealed dysmyelopoiesis with hemophagocytosis. A low dose of fluconazole (50 mg daily) was administered for 5 days only to cure oral candidiasis and was stopped abruptly because of severe cytolysis. However, two cultures of stool and one of sputum revealed numerous Candida albicans isolates. On 14 January 1997, a combination of lamivudine, stavudine and indinavir was initiated. On 18 January, fever and hematologic abnormalities resolved (white blood cells 3100/mm3; neutrophils 2200/mm3; hemoglobin 9.6 g/dL, and platelets 155 000/...