

## Samples From Cases of Delusional Parasitosis as Seen in the UK Parasitology Reference Laboratory (2014–2015)

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Delusional parasitosis is a common syndrome seen in Infectious Diseases clinics. These patients characteristically provide samples as evidence of their infestation. We prospectively catalogued and characterized 138 samples from these patients, processed in the UK Clinical Parasitology reference laboratory from January 2014 to April 2015. No human parasites were identified.

**Keywords.** delusional parasitosis; delusional infestation; Ekbom syndrome.

Delusional parasitosis (DP) or Ekbom syndrome is a psychiatric disorder characterized by a persistent and false fixed belief of parasite infestation. Symptoms can resemble bacterial, fungal, or parasitic infections (ICD-10, DSM IV). As far back as 1656, in his essay “A letter to a friend,” Sir Thomas Browne described a case of likely delusional infestation [1]. There are classic and well-described forms of the delusion involving mites, insects, and worms; however, we see variations on these themes, for example, including inorganic matter. In recent years, Morgellons has been used to describe fibers or threads in the skin presumed to represent parasites or other infections that have appeared spontaneously [2]. This phenomenon led to the suggestion to change the nomenclature from delusional parasitosis to delusional infestation (abbreviated in the literature to DI) [3]. DP or DI is predominantly a monosymptomatic delusion that can occasionally be shared and induced in others, mainly in the same household (Folie à deux, in up to 10% of cases) [4]. Estimates of comorbid psychiatric pathology in large case series range from 31% to 81% [5–7].

This condition has the potential to alienate patients who are generally reluctant to seek psychiatric attention. In our

experience, each patient typically requires a minimum of 45 minutes per new patient visit, longer than the allocated appointment time of 30 minutes.

As with all delusions, by definition, those experiencing symptoms are adamant in the reality of their symptoms. The nature of the delusion means that individuals are not necessarily reassured when labs report no evidence of infection in the samples they have submitted, even after experts have reviewed them and their samples have been processed in a specialist laboratory. The condition responds to antipsychotic drugs if the patient is prepared to accept treatment with them [8, 9].

One of the main characteristics of this syndrome is the tendency of patients to volunteer samples for examination, and it is a common demand for the physician to inspect the samples or send them to an experienced laboratory [10]. Traditionally, the “matchbox sign” [11] described the way the patients presented to clinicians with the samples inside a matchbox in days when cigarette smoking was common and matchboxes readily available. Nowadays they have been replaced as specimen containers by Ziplock bags or universal containers [12]. It is common for patients to offer “evidence” of their infestation in photographs and videos, often self-recorded on their personal phone, tablet, or laptop.

The literature contains large case series primarily from a clinical perspective [7, 13, 14] but relatively limited evidence in the study of large clinical, histological, or even environmental samples of patients with a formal diagnosis of DI. A large study from the Mayo Clinic that looked at 108 patients showed predominance of skin (34%) and scab (25%) in the samples that were patient-provided, followed by textile fibers (18%). Insects were mainly provided by patients with fixed delusion of parasites (13%). Similar results were brought to light from a multisite European study of 148 cases in which skin and hair were the main specimens. Pearson et al. studied 115 cases of Morgellons, and the material from nonbiopsy samples of this cohort showed mainly proteins, consistent with skin and cotton. No study showed evidence of infestation [2, 12, 15].

Understanding the nature of the specimens may support clinicians in the management of cases and, moreover, to construct the most appropriate clinical pathways. We prospectively reviewed the nature of samples received in the United Kingdom National Parasitology Reference Laboratory in London from patients with delusional parasitosis.

### Study Site

The Hospital of Tropical Diseases (HTD), based in central London, sees approximately 8800 outpatients per year and around 2500 emergency “walk-in” outpatients per year. We estimate that patients with a suspected diagnosis of DP account for around 15% of clinic appointments.

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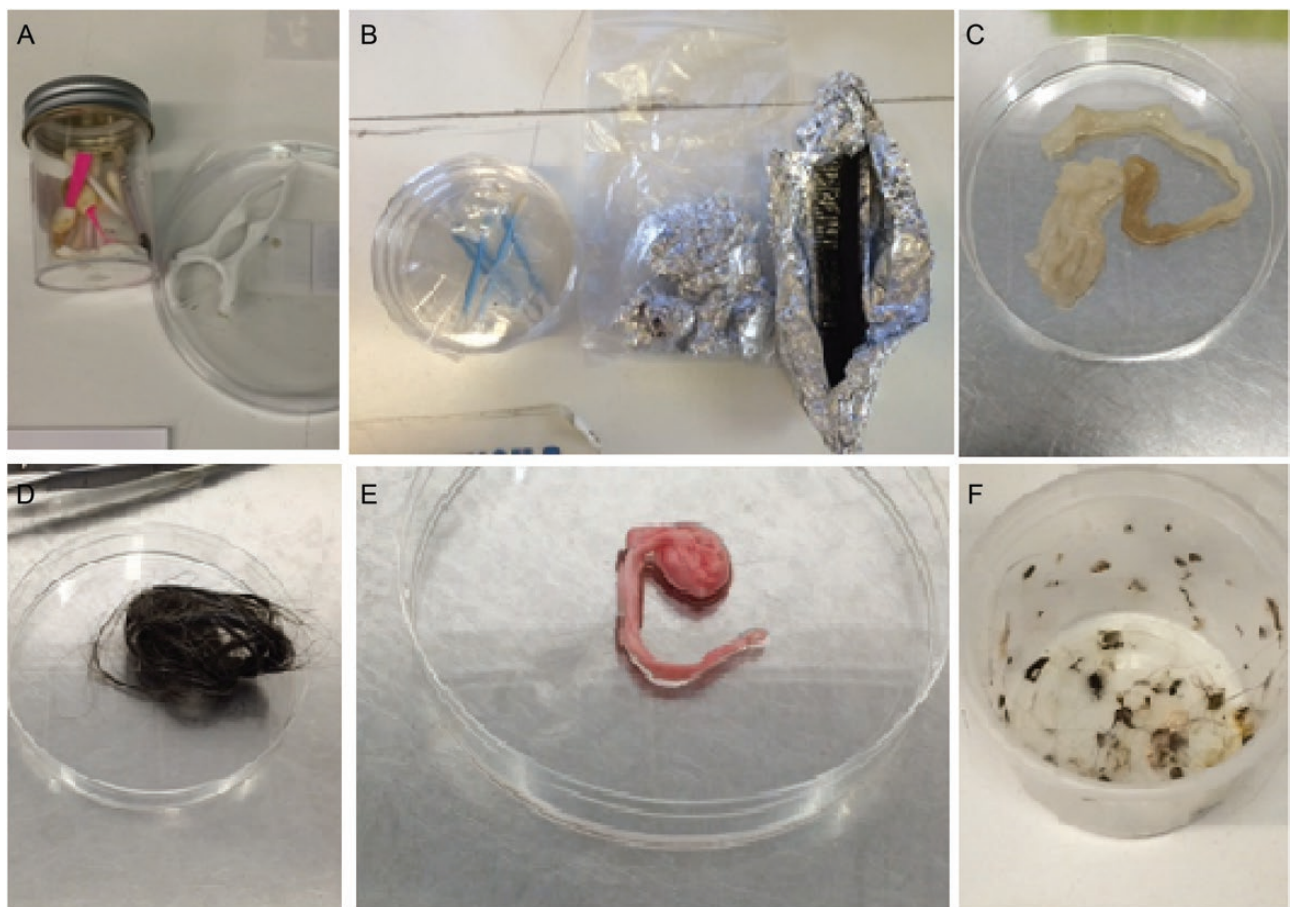
The Department of Clinical Parasitology is a specialist and reference laboratory, serving as a tertiary referral center and equipped with expert microscopists and serologists. Over 10 000 specimens are examined by microscopy each year, and the unique collection of specimens sent represents a much higher proportion of DP specimens than seen in other laboratories.

## METHODS

From January 2014 to April 2015, we prospectively characterized and catalogued all the specimens from delusional parasitosis patients. These specimens were received from clinicians in other centers or from our own Hospital for Tropical Diseases clinic. All were from patients who had been assessed with symptoms of suspected infestation, but medical screens, tropical screens, and investigations had been negative. The symptoms and presentations were indicative of delusional parasitosis. The patient demographics and sample content were recorded, and a photographic record of specimens was made. Patients were followed up by the referring teams.

Samples were received from the Infectious Diseases or Parasitology outpatient clinics at the Hospital of Tropical Diseases, from primary care health centers in the catchment area, and as referred specimens from external laboratories requesting a second opinion. Specimens were received as part of routine laboratory diagnosis, and data were recorded anonymously; hence no ethical approval was required.

Each sample was examined by 2 experienced microscopists under low power using an entomology microscope. If a parasite was suspected, the specimen was then transferred and examined under a standard light microscope. In samples containing skin, potassium hydroxide was added to look for scabies mites or fungi. When an insect was found, the sample was referred to the London School of Hygiene and Tropical Medicine (LSHTM) or the Natural History Museum in London for identification by an entomologist. The presence of fibers and vegetable matter was recorded. Specimens were then stored for a year in case re-examination or a second opinion was requested. Samples were classified according to the source of the specimen and the laboratory findings, following the schema from previous literature [15].



**Figure 1.** Examples of samples (all thought by those affected to be parasites). A, Specimen collection pots. B, Kitchen foil in place of a matchbox. C, Mucus strand. D, Hair, skin, and fibers. E, Mucus cast. F, Hair.

## RESULTS

A total of 138 samples from 123 patients were analyzed. Ten patients provided multiple specimens, and 6 of them were multiple samples at different points in time.

Eighty-nine samples were received from our catchment area, 81 from the HTD outpatient department, 4 referred from general practitioners (GPs), 2 from the General Dermatology clinic, and 1 from the Sexual Health outpatient clinic. From external hospitals and private laboratories, we analyzed 44 samples, and 5 samples arrived from private sector clinics (2 Tropical Medicine, 2 Dermatology, 1 private GP).

Of the specimens received, 74 (59%) were from female patients and 51 (41%) from male patients. The median age of patients (interquartile range) was 48 (39–62) years. Samples were often patient-provided either in a clinical universal container or in a specimen box (Figure 1), and frequently samples contained mixed material. Examination of the samples revealed: (a) skin flakes: 24; (b) mucus: 6; (c) hair: 13; (d) debris: 1; (e) nails: 2; (f) synthetic or textile fibers: 25; (g) plant material or vegetable matter: 10; and (h) insects (excluding ectoparasites) or nonpathogenic worms: 13. Five of these were earthworms, 1 leech, 1 polychaete annelid worm, 1 insect larvae, 2 were confirmed as parts of insects, 2 were too disintegrated to enable final identification, and 1 was sent away for further identification to the LSHTM. Seventy-four additional samples, with no other findings, were reported as no worms or parasites seen (Supplementary Data). No human parasites were identified.

## DISCUSSION

This is the first survey of its kind in the UK to focus on and characterize the actual specimens. They represent the samples that eventually reach the laboratory; hence we estimate that the total number of patients seen in general or specialized dermatology clinics as well as infectious diseases clinics is likely to be higher. Our results, where skin, scabs, and textile fibers were the predominant findings, correlate with other large reports, in which no evidence of infestation was shown [12, 15]. One limitation of our study is the lack of histological samples to complement our results.

In many cases, the morphology of the specimens resembles certain patterns in nature that can lead to misinterpretation by the patient or even the doctor. Expert laboratory examination of samples from patients with suspected delusional parasitosis is a critical step in excluding true parasitic infection, such as myiasis. Microscopy for precise identification might be required to differentiate mucus strands from intestinal helminths, hair from clothing (or domestic pets) from round worms, and seeds from eggs.

Moreover, free living insects or worms (earthworms) can be found and correctly identified by the patient as worms, but incorrectly assumed to be parasitic. Such an interpretation of the

findings is understandable, as the patients are not usually entomologists or parasitologists, so careful nonconfrontational explanation of the findings is required. Unfortunately, the underlying delusion prevents the patient from accepting an alternative diagnosis to his/her beliefs.

Furthermore, the Internet reinforces their misinterpretation of the appearances, and Internet chat rooms (not available in the days of matchboxes) put them in touch with other sufferers and thus add credence to their beliefs.

Through reporting what the submitted specimen has been found to be, the responsible clinician is able to have an informed discussion with the patient, and such information can facilitate referral pathways to mental health services. It is essential to engage GPs, psycho-dermatologists, and infection specialists early in the identification and initial management of these cases.

## Supplementary Data

Supplementary materials are available at *Open Forum Infectious Diseases* online. Consisting of data provided by the authors to benefit the reader, the posted materials are not copyedited and are the sole responsibility of the authors, so questions or comments should be addressed to the corresponding author.

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