

The first description of an oesophageal candidosis by Bernhard von Langenbeck in 1839

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Summary

In November 1839 the young university lecturer Bernhard (von) Langenbeck (1810–1887) published the first description of a fungus as aetiological agent of an oropharyngeal and oesophageal candidosis. We present his in English translated paper entitled 'Finding of fungi on the mucous membrane of the gullet of a typhoid fever corpse' (Germ.) in '*Neue Notizen aus dem Gebiete der Natur- und Heilkunde*' (Froriep). There are interesting particulars in Langenbeck's description and discussion. The publication happened at the same time as that by Johann Lukas Schoenlein about fungi as the cause of the favus lesions. In this time Langenbeck lived at Göttingen. Later he went to Kiel and Berlin and became one of the most prominent surgeons of the 19th century. He sponsored the founding of the German Surgical Society, the Berlin Medical Society and the '*Archiv für Klinische Chirurgie*'. In 1864 he was ennobled. Some of his assistants were Th. Billroth, R.U. Kroenlein, F. von Esmarch, and F. Trendelenburg.

Key words: Oesophageal candidosis, Bernhard von Langenbeck, history of science, mycology.

Publication of Langenbeck's paper

In November 1839 the young university lecturer Bernhard Langenbeck (Fig. 1) published the first description of a fungus as aetiological agent of an oropharyngeal and oesophageal candidosis from Göttingen (Fig. 2). The paper was entitled '*Auffindung von Pilzen auf der Schleimhaut der Speiseröhre einer Typhus-Leiche*' (Finding of fungi on the mucous membrane of the gullet of a typhoid fever corpse) (Fig. 3) and appeared in the well-known '*Neue Notizen aus dem Gebiete der Natur- und Heilkunde*'.¹ Despite of the declaration as a preliminary communication a continuation did not appear.

The publishers of the journal were Ludwig Friedrich (von) Froriep (1779–1847) and his son Robert Froriep (1804–1861). The father (former full Professor of Obstetrics, Surgery and Anatomy) was the leader of

the Regional Industry Office in Goethe's Weimar, later director of the medical service there. His son served as Professor of Surgical Anatomy in Berlin.

Translation of the paper

Finding of fungi on the mucous membrane of the gullet of a typhoid fever corpse.

Preliminary communication of Dr B. Langenbeck, university lecturer at Göttingen.

At the autopsy of a man died of abdominal typhoid fever I found, in addition to the ulcerations in the caecum and in the final part of the ileum occurring so often, a thick membranous coating, which covered the tonsils from a part of the pharyngeal cavity, but mainly the whole inner surface of the gullet from the pharynx to the cardia. This appearance was not very usual in the case of typhoid fever and combined with a peculiar appearance of the membrane, which was strongly different from detached epithelium and from the usual fibrous material in the case of laryngitis exsudativa; all this induced me for a more precise investigation.

According to its external aspect the pseudomembrane corresponded most of all with the small membranous

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Figure 1 The young university lecturer Bernhard Langenbeck at Göttingen.

spots, as they appear on the mucous membrane of the oral and pharyngeal cavities in the case of aphthous state.

It formed an about $1/8$ " [sic] thick, loose, yellowish-opaque, on the surface wool-like appearing layer, which strongly adhered with the mucous membrane of the oesophagus. If one disconnected it from the mucous membrane this appeared reddened more strongly as normal, had lost their epithelial cover and appeared rough, granulated as it were.

Under the microscope magnified of 200 and 400 lines, the pseudomembrane did not show any of the

known forms of exudates; however, it consisted of an immense number of in confusion grown fungi. The thallus of these fungi consists of tangledly branched, extremely tender threads. A simple cell line, whose cells are a little stretched, puts the threads together. Neither in the cell contents is to be noted something solid nor in the wall cell nuclei. Constrictions of each two cells on the point of contact were not notable. At the outer surface of the threads, distributed over the whole length, globular or oval water bright cells of a little larger diameter than the threads and with one, rarely with two, sharply limited eccentric cell nuclei are to be seen. In some cases, these cells that quite corresponded to mould spores in their form, attachment manner to the thread and its division from it had a greenish colouring. They are separated at the point of contact of each two cells of the thread and do not find themselves united to several of these. After they are separated from the threads, they are in a balled manner distributed between the threads of the thallus.

In a fine cross-section of the mucous membrane and the fungal layer me seems to be a growing of the thallus threads out of the substance of the mucous membrane.

The intestinal ulcers in the caecum and ileum showed different stages of development; however, some seems to be on the way of scarring and some were covered by a thin yellowish layer fixed on the ulcerated surface similar to the fungal layer in the oesophagus. In this yellowish mass, which was very difficult to be separated from the surface of the ulcer and contaminated with faeces, I occasionally believed to find threads of the thallus and very similar spores as on the mucous membrane of the oesophagus; however, the late time of



Figure 2 The surgical hospital of Göttingen.



Figure 3 Title-page of Langenbeck's study.

the day was hindering the observation and on the other day the threads of the thallus and the spores as well had already lost a lot of their regularity, so that I dare not declare, the yellow coating of some intestinal ulcers would consist of the same fungi.

In the very liquid intestinal contents I also occasionally believed to observe the spores described above; however, I found no indication of threads here. The stomach, that unfortunately I could not examine more precisely, was occupied with several strongly reddened and rounded spots on its mucous membrane and contained an only very small quantity of yellowish looking slime.

Because there was no sign of beginning disintegration in the corpse and neither in the stomach nor in the gullet a trace of liquid was available, that could be

drunk immediately before death; as furthermore the mass in the oesophagus recognised as fungal vegetation had its location there so fixed, I would like to say organically pasted with the mucous membrane – one find it hard to believe the presumption the fungi would be the product of a disintegration after death or would be able to have formed themselves in a fermentable liquid drunk immediately before death.

If this fungal formation on the mucous membrane of the oesophagus was not an accidental exception and – what further investigations above all of the yellowish crusts on the intestinal ulcers of typhoid patients will be shown – if on any part of the intestinal mucous membrane such vegetations are constantly to be found, the typhoid fever is to be categorised to the muscardine, the known epidemiological-contagious illness of the

silkworms. How here the growth of a fungal species, *Botrytis bassiana*, in the fat body of the animal is the cause of an illness spreading in a disastrous way, so one could conclude that the development of a fungus species on the digestive mucosal membrane of the human being is the reason of the clinical symptoms in the case of typhoid fever, of symptoms which finally would be explained by a disintegration of the juice masses through the parasitic vegetation. In the places of the mucous membrane, at those the fungal vegetation at first appears and proliferates, an inflammation with outcome in suppuration, the known ulceration, could develop as result of the stimulus, and the contagiousity of the illness could be explained by a transfer of the mould spores to other individuals at last.

Biography of Bernhard von Langenbeck^{2,3}

On 8 November 1810, Bernhard Rudolf Conrad Langenbeck was born in the village of Padingbüttel near the mouth of the Weser. In 1830 he entered the University of Göttingen to study medicine under the watchful eyes of his uncle, Conrad J. M. Langenbeck, Professor of Surgery and Anatomy. Langenbeck received his doctorate with honours in 1834. An honorarium provided him a 2-year period of post-doctoral studies in clinics in Belgium, Paris and London.

After his return to Göttingen he became a university lecturer (Physiology and Anatomy). In this time he published his paper about an oesophageal mycosis (Fig. 3). At the age of 30 he was Professor of Pathologic Anatomy and in the following year (1841) he went to Kiel as a professor of surgery.

In 1848 he accepted the Professorship of Surgery in the University of Berlin (Charité) and in the following years he became one of the most prominent surgeons of the 19th century. During his 34-year tenure in Berlin he built the surgical clinic into an institution of repute. He has had a great popularity as a teacher, consultant and dexterous operator. Subperiosteal resection of bone and joint is probably Langenbeck's best-remembered contribution to prevent amputation. For treating fractures he advocated immediate fixation by firm dressings. He presented the first report of the splitting of the hard palate for correction of cleft palate at a meeting of the Berlin Medical Society in 1861. Well known are Langenbeck's instruments as needle holder, wound retractor, periosteal elevator, rasp, and haemorrhoidal forceps. His surgical school emphasised physiological and anatomical knowledge in operative techniques, the value of microscopic investigation and respect for



Figure 4 Professor Dr Bernhard von Langenbeck.

wound infection. Langenbeck's description of a case of actinomycosis of the vertebral column with illustrations from 1845 was later published by Israel.⁴ Langenbeck sponsored the founding of the German Surgical Society – he served as its president in 1874–1885 – the Berlin Medical Society in 1860 and the 'Archiv für klinische Chirurgie', later 'Langenbecks Archiv', in 1861. Some of his assistants were Theodor Billroth (1829–1894), Rudolf Ulrich Kroenlein (1847–1910), Friedrich von Esmarch (1823–1908) and Friedrich Trendelenburg (1844–1924).

In 1864 Langenbeck was ennobled (Fig. 4). He retired in 1882 and died at Wiesbaden on September 29th, 1887. Theodor Billroth, Rudolph Virchow and Ernst von Bergmann gave obituaries among others.

Discussion

Langenbeck's report on oro-pharyngeal and oesophageal thrush from 1839 is probably the first time that

this picture was linked with the presence of a fungus in tissues. Oral thrush has been noted in his 'Epidemion' book 3 about 410 BC by Hippocrates (460–370 BC)⁵ and others later on. Oesophageal candidosis has been reported as early as 1835 by Véron [6] in a child with thrush who died from fatal perforation.

Langenbeck has given after autopsy a correct description of a severe oro-pharyngo-oesophageal mycosis with the development of extended, strongly adhered pseudomembranes. After disconnection from the mucous membrane a loss of epithelium and strong redness appeared.

By microscopy without staining he saw typical mycelia that seem to connect the oesophageal squamous epithelium. His description of pseudomembranes corresponds to septate hyphae, branched pseudohyphae and blastoconidia. Unfortunately Langenbeck did not draw his findings. But it is the description of the same picture as we find it even in scanning electron microscopy today.⁷ On the other hand the postulated connections between fungal formation and pathophysiology of typhoid fever being categorised to 'muscardine' were wrong.

Langenbeck's description was published in November 1839. Probably in the same month or some weeks ago Johann Lukas Schoenlein (1793–1864) informed of his observations about fungi as a cause of the favus lesions together with a drawing.^{8–10}

Parts of this paper were presented as a poster at the 6th Congress of the European Confederation of Medical

Mycology (ECMM), November 9–11, 2000, in Barcelona, Spain, and dedicated to Prof. Dr Johannes Müller, Emmendingen, in 2002.

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