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BLASTOMYCOSIS

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A CASE of blastomycosis occurring in an unusual situation recently came under observation at the Royal Victoria Hospital, Montreal. It had been previously diagnosed as tuberculosis, and unsuccessfully treated as such; and this fact, as well as its unique situation, stimulated us to report it along with several other cases found in the hospital records, and to briefly review the literature.

There are two forms of this disease—the cutaneous and the systemic.

As a rule, the former begins as a papule or papulo-pustule which slowly enlarges. Most cases do not come under observation till they have attained a considerable size, *e.g.*, that of a twenty-five-cent piece or even larger, have ulcerated, and are discharging a serous or seropurulent secretion. The following are the chief characteristics of this form:

A patch of varying size projecting slightly above the surrounding skin and covered by irregular papilliform elevations, giving it somewhat the appearance of a cauliflower. This appearance is due to the presence of more or less bulky crusts which cover the surface of the lesion. On removal of these crusts the papules proper are seen; small, firm and comparatively dry in the younger lesions; large, lobulated and covered with a seropurulent secretion in the older or untreated lesions. The edges (see Case I, Fig. 1) are smooth, sloping, of a dull red color and sharply defined from the surrounding skin; on close observation they show numerous miliary abscesses. It is from these abscesses that the causative organism is best obtained in pure culture. A drop of pus when treated with 20 per cent. KOH and examined under high power reveals the organism as a double-contoured, vacuolated, yeast-like body which frequently shows budding forms. This latter condition is of

great diagnostic value, as it eliminates the possibility of confusing degenerated cells, fat globules, air bubbles, etc., with the organism proper. Media inoculated with this pus will show in the majority of instances a growth in from two to sixteen days, the appearance of which will vary greatly according to the medium used, the temperature and the amount of moisture present.

It has been suggested that these variations in appearance are due to the presence of more than one variety of blastomycetes. Viewed under the microscope, cultures show a mycelium with bud-like projections and also budding forms similar to those seen in pus. The mycelium formation does not occur in the tissues. Histologically, the most marked changes occur in the rete, which is the seat of an extensive hyperplasia, sending down irregular prolongations into the corium. The hyperplasia has been mistaken for epithelioma. These prolongations contain the miliary abscesses which are so characteristic of this disease.

The abscesses vary in size and are found in all parts, both superficial and deep, of the hyperplastic epithelium. They contain leucocytes, epithelial detritus, giant-cells of the Langhan's type and, most important of all, the organism peculiar to the disease is present in varying numbers and is easily overlooked. Too much emphasis cannot be laid on the presence of giant-cells. Although they are of the type usually seen in tuberculosis and have misled many into diagnosing the condition as such, they are in all probability "foreign-body" giant-cell formations, and closer examination will reveal the presence of the specific organism in their vicinity (Fig. 3). The histological picture may be summarized as a hyperplasia of the rete, the formation of miliary abscesses containing the organism and the presence of giant-cells. The most important fact in the etiology is that the disease is undoubtedly due to infection of the blastomycetes. Why certain yeasts should be pathogenic while others are not is still an unsolved problem. No predisposing causes have been recognized, but the following conditions have been noted in the cases reported, viz.: unfavorable hygienic surroundings; some debilitating systemic conditions (*e.g.*, diabetes, as in Case III); males are more often infected than females, probably owing to their more frequent exposure to infection; any age, but apparently more frequently met with between the fortieth and sixtieth years; and trauma.

We believe this latter factor to be of considerable importance and that the organism will not grow on the intact skin, some abrasion being necessary for infection to occur. In corroboration of this we note the history of trauma in all the cases reported in the hospital; and further,

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in the study of actinomycosis at the Royal Victoria Hospital it was found that an abrasion was also necessary before infection could occur (*Jour. of Am. Med. Sc.*, June, 1913).

Clinically, the disease must not be confused with tuberculosis verrucosa. The following are the more important points of differentiation: the characteristic border and abscesses of blastomycosis of the skin, the results of histologic and bacteriologic examination, and the fact that the morbid condition improves under the influence of potassium iodide. Of lesser importance is the more frequent occurrence on the face and the more rapid development than lesions generally recognized as tuberculous. The constitutional symptoms of tuberculosis are also absent. *Lupus vulgaris* is distinguished by its characteristic nodules. Only the hyperplastic form of the disease could be confused with cutaneous blastomycosis. The differential features are practically those considered under tuberculosis verrucosa. In addition, tuberculosis verrucosa is a disease of early life while blastomycosis most frequently occurs after forty.

The disease may be confounded with syphilis, but other manifestations of this latter condition will usually be present. From carcinoma the disease can be differentiated by the soft base, by the multiplicity of the lesions, by the absence of glandular enlargement, and by the improvement and spontaneous healing shown under the influence of potassium iodide.

The surgical treatment consists in removal *en masse* where possible and this is probably the most effective method of cure. If this is impossible curetting may be tried, but it is not a certain preventative of the return of the malady. Medicinally, potassium iodide appears to be almost a specific and should be given in large doses. It does not appear to act directly on the organism but stimulates the tissues to ward off the disease. A combined surgical and medical treatment is frequently employed. X-rays have been recommended, but in Case IV of our series, which at first was diagnosed as lupus and treated as such by X-rays, the condition seemed only to be aggravated. The prognosis is generally favorable unless complicated by some intercurrent infection.

Following are detailed reports of four of the six cases occurring in the hospital records. Case III is of particular interest, as it shows the liability of the disease to become general.

CASE I.—A. V., age forty-eight; Italian laborer. One year ago patient first noticed a hard swelling just posterior to anus, about the size of a hazel-nut. This was opened with a pin and a small amount of blood-stained fluid escaped. Shortly after this hard

mass ulcerated, the ulcer gradually increasing in size. This condition was diagnosed as a tuberculous ulcer and curetted. The glands in the inguinal region became involved and broke down, discharging pus. Examination showed an ulcerated area just posterior to anus (see Fig. 1), extending backward in anal cleft, $1\frac{1}{2}$ inches by $1\frac{1}{2}$ inches. The surface of the ulcer was bright red in color, with granular appearance. The edge was raised and seemed to be composed of numerous small papillomas (Fig. 1).

Treatment.—Curettage of ulcer; plus potassium iodide, grs. 30, t.i.d.

Result.—Improving.

Pathological Report.—Pus from inguinal region showed typical double-contoured organisms. Sections of tissue revealed marked epithelial hyperplasia, numerous small collections of polymorphonuclear leucocytes and numerous giant-cells of Langhan's type (Fig. 2), while here and there, particularly near the giant-cells or in the abscesses, the organism was seen (Fig. 3).

CASE II.—J. O.; age sixty-three; farmer. Seven weeks previous to admission to hospital, while passing through woods, received a small scratch over malar eminence by a branch. A scab formed over the abrasion under which a small quantity of pus escaped. On entrance to the hospital the ulcer was the size of a twenty-five cent piece and covered with a thick scab, had a rather punched out appearance, and the skin surrounding was reddened and thickened. Submaxillary glands enlarged.

Treatment.—Excision of ulcer, plus potassium iodide, grs. 30, t.i.d.

Result.—Cured.

Pathological Report of Tissue.—Sections showed marked hyperplasia of the epithelium, owing to downgrowth of lower layers. In places atypical pearl formation was noted. Small abscesses were numerous in the epithelial downgrowths, while throughout the section giant-cells of the Langhan's type were seen. Later definite and typical blastomycetes found.

CASE III.—Italian; age forty-three; laborer. Admitted April 3, 1910. Died June 14, 1910.

Complaints.—Sore right eye.

Trouble began about middle of September, 1909, when he first noticed a small pimple about the size of a split pea on the outer side of the external canthus of the right eye. It was slightly tender and gradually increased in size till early in December, 1909, when it broke down and began discharging a small quantity of blood-stained, thin material. This continued till the present. There has been a certain amount of surrounding oedema since January 1, 1910. He does not complain of pain but of tenderness. Has had



FIG. 1.—Case I. Shows ulceration posterior to anal orifice. Note raised edges and papillary appearance.

Double
contoured—
organism

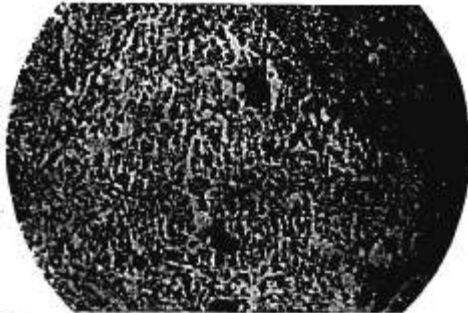


FIG. 2.—Showing organisms in granulation tissue.

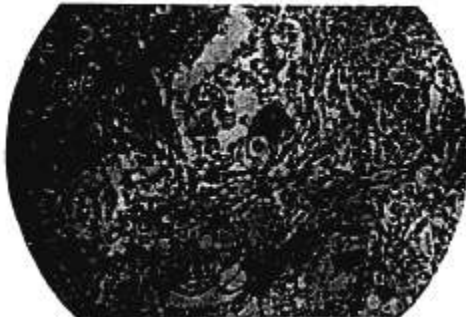


FIG. 3.—Organism situated near giant-cell. Note proliferation of epithelium and atypical pearl formation.

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occasional headaches. Has always been a healthy man and denies venereal trouble. No history of injury could be obtained. Family history negative.

Present Condition.—Fairly well-developed and well-nourished man. Pale, not complaining of pain but of tenderness around sore—and of headaches. Over the right temporal region extending from temporal ridge downward, including outer third of right eye over to the malar prominence, is a diffuse swelling, very slightly discolored and tender. Point of maximum tenderness is just over temporal region, $1\frac{1}{2}$ inches behind the outer canthus, and on a somewhat higher level. There is a small discharging sinus close to the temporal side of the outer canthus; the edges are red, slightly swollen, and fresh masses of granulation tissue discharging a small quantity of a sero-mucopurulent material are seen. An ordinary-sized probe could be passed upward and backward a distance of $1\frac{3}{4}$ inches. Respiratory, circulatory, and genito-urinary systems normal. Urine: amber, clear, acid; 1022; no albumen, no sugar, no casts.

Treatment.—Potassium iodide, grs. 30, t.i.d.

Diary.—April 11, incision made over right temporal region down to bone. Peculiar condition found in bone. Small piece kept for examination. Cut surface of bone did not bleed much. Sinus was curetted and discolored tissue removed; wound packed with iodoform gauze. April 16, complained of bad headaches, very restless; same on April 17. April 20, dressed, no discharge, wound granulating up. April 27, slight chill, no rise in temperature. May 15, smears taken of pus in eye (?) showed many typical blastomycetes (Drs. Keenan and McKenty). June 1, sinking fast, taking no nourishment, dull, sleeping most of the time. Died June 14.

Diagnosis.—Blastomycosis infection.

Post-mortem Examination Four and a Half Hours After Death.—Mycosis of widespread type; caries of frontal bone with suppuration; suppuration of ethmoidal sinus, sphenoidal sinus, and superior nasal meatus; caries of right temporal bone; basal suppurative meningitis; internal hydrocephalus; retropharyngeal abscess; disseminated suppurative foci in lungs; old scars on extremities; pleural adhesions; chronic pericarditis; atheroma of aorta (slight); fatty degeneration of liver; nodules in spleen; retention cysts in kidney; congestion of small and large intestine; purpuric hemorrhages of skin.

NOTANDA.—The case has been previously classed among the blastomycoses and is of very remarkable nature, first, owing to the rarity of generalization of disease in infections of this kind; second, owing to the nature of the bone lesion. The steadily pro-

gressive carious change which took place and the extension of disease by actual continuity from the forehead through the orbital plate to the various cells at the root of the nose, with secondary infection of the meninges on the one hand and partial involvement of the orbit on the other, and the spread shown finally into the retropharyngeal tissue, are all worthy of great note and full of interest. The organism at work was a spherical body with well-defined capsule and chromatic granules in its interior. It multiplied by fission, one individual producing two others or more. A culture which was at the time successful showed a growth which was definitely mycelial, so that it shows an alternation of generation accounting for its encysted form in this case. It is probable that the lung condition was due to aspiration, since there were no secondary deposits elsewhere. The nodules in the spleen are apparently of a different nature. (O. C. Gruner, Path. Dept., R. V. H.).

CASE IV.—Mrs. D.; age thirty-two; farmer's wife.

Complaints.—Growth on nose.

History of Present Illness.—Two months previous to entrance to hospital a small pimple appeared on tip of nose which gradually increased in size; around the edge other similar ones appeared and these gradually coalesced until the whole lower half of the nose was involved. The ulcerated area has a peculiar warty appearance. The edges fade gradually into the surrounding skin in places, while in other areas the edge is heaped up and of dark brownish color. On the surface of the ulcer numerous papilliform growths were noted, in the centre of which small drops of pus can be extruded. In the older parts of the growth these papilliform projections become more closely applied and were covered with thick dark scabs which, on removal, revealed a small ulcerated surface. These crusts are often very adherent. The glands of the neck are not involved. Personal history negative.

Family History.—Several relatives died of tuberculosis.

Treatment.—At first the condition was looked upon as lupus, and treated with X-rays, which seemed to increase the rapidity of the growth, as after the beginning of treatment the disease spread very rapidly. Later examination of pus revealed the organism. Afterwards this patient was put on iodides and she immediately showed signs of improvement.