THE NATURE
OF
IODIDE-OF-POTASSIUM ERUPTION.

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It is now established that the administration of preparations of iodine usually produces an eruption which varies in character in different cases. All practitioners of experience are familiar with the papular eruption or common iodine-acne, but the combined testimony of a considerable number of observers during the last decade has shown that the rash sometimes assumes a more severe type. In such cases the iodine eruption may be pustular, or in the form of bullæ or blebs containing serous or sero-sanguinolent fluid, or purpuric, and more than one of these forms may be found together on the same patient.¹

¹ See (*e. g.*) Cazenave, quoted by Boinet in his work, 'Iodothérapie,' Bradbury, 'British Medical Journal,' 1871; Bumstead, 'American Journal of the Medical Sciences,' 1871; Ringer, 'Practitioner,' 1872; Report by the Registrar in the 'London Hospital Report,' 1875 (a case of Mr. Hutchinson's); Fournier, 'Revue mensuelle de Médecine et de Chirurgie,' 1877; Taylor, "Report of Meeting of the New York Dermatological Society," in the 'Archives of Dermatology,' 1877; Dr. Tilbury Fox, 'Transactions of the Clinical Society,' 1878; Sydenham Society's 'Atlas,' pl. xxxiii.

The explanation usually given of these eruptions, namely, that they are produced by stimulating effects on the secreting elements of the sebaceous glands, is, in the absence of direct proof that there is a special elective affinity on the part of these organs for iodine, only a fanciful one, and rests on no better foundation than the fact that the vascular tissues surrounding the hair-follicles and hair appendages are frequently the seat of congestion when the intermediate less vascular tissues of the cutis show no evidences of it.

I take the opportunity of submitting to the Society the results of a microscopic examination of a portion of skin which was the seat of a bullous iodide eruption. The patient was under the care of Mr. Howard Marsh in St. Bartholomew's Hospital, and it is through the kindness of this gentleman that I am able to report on the case. Mr. Marsh has also been so good as to furnish me with the following history.

"W. R—, æt. 35, was sent from the City Road Hospital for Diseases of the Chest, by Dr. Wharry, to St. Bartholomew's Hospital on May 18th last. In his letter Dr. Wharry stated that the patient, who had renal and mitral regurgitant disease, with hypertrophy of the heart, had been taking either iodide of potash or syrup of the iodide of iron, continuously for tertiary syphilis, from Feb. 1st to May 10th, when the medicine was discontinued. On May 13th the present eruption began. On his admission (May 18th) on the right cheek was a bulla (?) of irregular shape, about as large, at its base, as a shilling, rising abruptly and prominently from the surface, and apparently containing a turbid, opaque, cream-coloured material, of the consistence of thick pus. The base of this 'bulla' was somewhat solid and indurated, dusky red in colour, and very irregular in outline, as if it were formed by the coalescence of two or three smaller 'bullæ,' but this was uncertain; the surface was covered with a brownish scab or crust tending to dry. A very similar 'bulla' was situated on the right cheek just below the eye, and on the left side of the tip of the nose was a third, about as big as a sixpenny bit. Scattered over the face were several

small 'pustules,' varying from the size of a pin's head to that of a large split pea; and one seated on the left ear remarkably resembled a pemphigus bleb. A small pustule was situated on the left wrist, and one, somewhat larger, on the dorsum of the right hand.

"The patient died suddenly on May 22nd."

The rash was considered to be due to iodide of potash by Mr. Marsh, Mr. Baker, Mr. Langton, and by Dr. Crocker, who saw the patient on May 20th.

The piece of skin examined was from the dorsum of the right hand.

The diagnosis, vouched for by Mr. Marsh, Mr. Baker, Mr. Langton, and Dr. Crocker, leaves little room for comment, but it may not be superfluous to state that Mr. Marsh's description of the eruption agrees in every respect with that given of iodide bullous eruptions by previous observers.

I received the portion of skin in chromic acid solution. A dark spot about the size of a pin head marked the centre of the bulla.

The tissue having been further hardened in alcohol, an examination of vertical sections showed the structure of the skin over which the bulla was situated to be as follows:

I find that the diseased tissue is divisible into three well-marked areas. In the centre there is a faintly granular, almost homogeneous, mass, within which here and there rows of leucocytes can be seen. This mass is mostly covered by a ragged and partly disintegrated epidermis. The substance of which it is composed is identical in appearance with a like substance often found in any part of the body when there has been effusion from blood-vessels in diseased tissues. In such cases it is sometimes found both within and outside the vessels. A layer of it enters into the composition of a scab. Its derivation from the blood is beyond question.

Proceeding from this structureless substance as a centre we next find a layer of exudation cells. The cells are suspended in a very fine reticulum which is probably fibrinous. Occasionally in this area the section of a blood-vessel is

observed, the calibre of the vessel being indicated by a thin, ragged wall, bounding a mass of red blood-corpuscles. Beyond this area comes a third, in which connective tissue can be recognised in a much altered condition. The bundles are represented only by fragments, and these fragments are separated from each other by spaces of considerable size. In the spaces are found exudation cells and a reticulum of fine fibres, similar to that found in the second area.

Amongst the disorganised bundles, sections of numerous blood-vessels filled with red corpuscles are seen, their walls showing more or less evidence of alteration.

This area is bounded by the normal bundles of the cutis tissue, the line of demarcation being very fairly defined.

The appearances I have described indicate effusion from the blood-vessels within a limited space, in sufficient force to produce disruption in one, and partially displace in another area the firmly knit bundles of the connective tissue of the skin. Such pressure from effused blood fluid in a limited area can only be produced by disorganisation of the walls of blood-vessels, and, in fact, vessels with altered walls are found in both the second and third areas of my division.

Appearances found in the unaffected connective tissue surrounding the bulla area, throw further light on the subject. Amidst the perfectly unaltered bundles blood-vessels are found, which in a limited and well-defined part of their course are plugged and distended by a faintly granular substance, similar to that found in the large mass in the central bulla area. At this part the distended vascular wall may be entire in so far as it is seen, or evidence of change may be detected in it. A considerable number of exudation cells are always found immediately outside the vessels, and sometimes the vessel appears slung in a space, across which, from the vessel to the connective tissue, fine fibres can be traced. There are exudation cells present in this space between the vessel and surrounding connective tissue. There was no evidence of disease in the hair follicles

or sebaceous glands immediately external to the disorganised tissue, and there were no remnants of epithelial or sebaceous elements found within it.

These appearances are sufficient to explain the formation of the bulla. They show evidences of a localised affection of the blood-vessels in a circumscribed area of the skin, attended by effusion of constituent parts of the blood. Part of this effused material is found coagulated after treatment by chromic acid and alcohol, and is evidently richly albuminous. The pressure is sufficient to displace the bundles of connective tissue and to rupture the mucous layer of the epidermis. The more fluid element of the blood necessarily escapes through the ruptured rete mucosum, and accumulating under the horny layer, as is the case with all similar effusions, a "bulla" is formed.

The size of the bulla and the nature of its contents will depend in such cases on the degree and extent to which the vascular wall is damaged, and on the size of the affected vessel.

That this injury to the blood vessels is independent of the glandular or epidermic elements of the cutis is shown by parts of blood vessels which are not in contact with, or even in immediate proximity to such elements, being affected.

The rationale of these eruptions, therefore, seems to be that there are conditions in which iodine, when present in the blood, attacks and disorganises the blood vessels at certain localised points. As a result of this injury to the wall of the vessel, there is an escape of blood fluid into the surrounding tissue, and more or less plugging of the vascular tube by coagula. It is a subject well deserving further inquiry, whether and to what extent the blood vessels of other organs are similarly affected.

The demonstration of an affection of the blood-vessels as a cause of iodine-bullæ suggests an explanation of the other changes known to be produced in the skin by iodine; namely, the common papular eruption and the rare, but now well-authenticated, instances of iodic purpura.

The papule of iodine-acne consists of a circumscribed area

of infiltration which usually surrounds a hair follicle. The redness and swelling of this area considered in the light of the acquisitions of modern pathology, are evidences of a localised affection of the blood-vessels, the moderate amount of exudation indicating that the affection is very limited in extent and degree. The tendency of iodine to exert its influence in a limited area, as illustrated by Mr. Marsh's case, may explain the formation of the iodic papule.

Iodic purpura can be looked on as the result of complete destruction of part of the vascular wall, with the effusion of a certain quantity of blood and the definite and sudden arrest of the circulation through the ruptured vessel—a circumstance that probably explains the absence of œdema. Probably the morbid change is here again strictly localised and it can only be produced by some destructive effect on a limited part of the vessel.

It may thus be considered that the iodic papule, the iodic bulla, and the iodic purpura spot represent different degrees of injury to the blood-vessels: in the first we have a limited œdema with congestion of the vessels; in the second an effusion of serum with more or less of the formed elements of the blood; in the third destruction of the wall of the vessel and hæmorrhage. The strictly local and limited action of iodine which I have found to produce the second, explains the localisation in the first and third.

In certain persons and in certain constitutional idiosyncrasies, the effects of poisons are unusually severe, and the action of iodine is in this respect not exceptional. The explanation of these rarer and more severe symptoms can only be guessed at, but it is not unreasonable to suppose that long retention of iodine in the capillaries when the circulation is sluggish from feeble heart-impulse, its deficient excretion from a similar or other cause, and a diminished vitality of the vascular wall which renders it more susceptible of attack, may each or all of them play an important part in the work of destruction.

It is only on some such hypothesis that a remarkable

feature in this case can be accounted for. The patient had been taking preparations of iodine from February 1st to May 10th without any eruption showing itself, and he then ceased to take the medicine. Three days after he had discontinued the iodide the eruption began, and on the ninth day afterwards he died.

The history of the case shows pretty clearly that the loss of vital power which ended in death must have been in operation before the last iodine taken into the system had been eliminated, and it is plausible to assume that the circulation becoming slow in the superficial vessels the iodine or its compounds present in the blood had time to attack and injure parts of the vascular wall.

DESCRIPTION OF PLATE III.

Iodide of Potassium Eruption (Dr. G. Thin).

Fig. 1.—Part of a section showing the second and third areas described in the text. On the left border towards its centre the cell reticulum is seen, and beyond that, narrowing on the right towards the rete mucosum is the third area of disorganised connective tissue, bounded below and on the right by normal bundles. *a*. The rete mucosum. *b*. Section of a blood-vessel. *c*. Mass of exudation cells lying in a delicate reticulum. *d*. Normal connective tissue. $\times 145$.

Fig. 2.—Shows part of a blood-vessel distended and plugged by granular coagulated substance. The vessel is surrounded by normal connective-tissue bundles. *a*. Exudation cells. *b*. Normal bundles of the connective tissue of the cutis. *c, d*. Elastic fibres. *e*. Distended and plugged vessel. (On the border of the vessel nuclei of the vascular wall are seen. Retraction during coagulation or hardening by chromic acid has left rounded spaces on the surface of the mass). *k*. Exudation cells between the vessel and the contiguous bundle. $\times 260$.