

AN EPIDEMIC OF GANGRENOUS DERMATITIS.

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EVEN though it prove a mild affection, as it did fortunately in the cases now to be described, gangrenous dermatitis as an epidemic complication of acute disease is sufficiently rare to deserve recording.

On the morning of 5th October, 1911, four female patients in one ward of the Hardwicke Hospital, Dublin, presented more or less remarkable examples of this condition. The cases were not under the care of any one physician or one set of nurses. I must thank my colleagues, Drs. O'Carroll, Coleman, and Travers Smith, for permission to report the cases under their care.

All four patients were suffering from enteric fever, and in each case the dermatitis was confined to the buttocks. As one case differed from the others only in the number and size of the gangrenous patches present it is unnecessary to describe each in detail. By far the most conspicuous case, both in the number and in the size of the lesions, was that of E. F—g., a married woman, aged forty-seven, under the care of Dr. Travers Smith. On each buttock, especially on the outer portion, but also in the natal cleft, were a number of coal-black spots. There were about two hundred and fifty in all. In size they varied from a tiny pin-head to the cross-section of the kernel of a hazel-nut. The larger ones were somewhat

oval, the medium-sized and smaller ones were circular. Here and there irregularly-shaped spots suggested the coalescence of smaller ones. With the exception of a few amongst the smallest, each spot was surrounded by a pinkish-red zone varying roughly in breadth with the size of the gangrenous area. The larger units were a little elevated, and felt lumpy, the outer margins being sharply defined; the smaller were not appreciably raised above the general surface. The centre of the actual mortification in the larger lesions were below the level of the margins. The surface of all the blackened parts and the entirety of the great majority were quite dry. But from the larger lesions in the case of E. F—g., a greyish-black, diffuent, but not appreciably foetid matter could be squeezed. Her night-gown and the sheets on her bed were stained with this ooze on the day the condition appeared. The necrosed tissue, where not diffuent, was firmly adherent to the surrounding tissues. When as much as possible had been removed with an instrument a greyish-black ulcer was left. The edges were perpendicular, and the depth was about one-fifth of an inch.

M. F., a girl of nineteen, had nine spots in or near the natal cleft, each one surrounded by a hyperæmic zone. Two spots showed central gangrene about the size of a split pea; in the remainder the gangrene was less extensive. I excised one patch entirely under local anæsthesia, and brought the edges together with a catgut suture. The stitch tore out—the result, I fear, of my inadequate surgical technique—but the wound healed up completely in about sixteen days without suppuration or other mishap. It was dressed with Friar's Balsam.

F. C., twenty-seven, and E. D., forty-four, showed five and six spots respectively, all small, with narrow, reddish

zones around. In every case many spots were in close relation to hair-follicles, but I could not be sure that all were.

All were moderately severe cases of enteric, but were clear mentally. None complained of pain or discomfort, though their skins were not anæsthetic. On the following day, however, and for some days subsequently, E. F—g. and M .F. (with good reason) complained of considerable soreness in the parts. There was no aggravation of general symptoms in any case, no elevation of temperature or acceleration of the pulse-rate.

On 6th October five males (P. H., M. L., P. L., J. B., J. H.), between eight and twenty-eight years of age, all suffering from enteric, showed a few spots, and in the same ward as those affected on 5th October were two fresh cases—M. C. H. (enteric) and E. F—n. (croupous pneumonia, delivered of a still-born six months' child on the second day of her illness, three days before admission from the Union Hospital). J. C., fourteen (typhus), had two spots over the eleventh and twelfth ribs on his right side; in this patient and in H. R., nineteen (enteric), the spots were on the back. In every other case they were on the buttocks. The ward-sister noted the spots on H. R. on 4th October, but as I did not see the patient that day my attention was not called to them till 5th October. They were very small, and one only of the three had a red areola. M. K., six (diphtheria), developed three spots on 8th October. She died the following day. This patient was on a different landing from all the others. J. L., male, nineteen (croupous pneumonia), developed three spots on 11th October.

Whether the necrosis was a post- or a pre-inflammatory condition is impossible to say. The sister and nurses in

the wards were absolutely definite as to the absence of any marks on the patients (H. R. excepted) on the night of 4th October, and I personally can answer that late on 5th October there was nothing to show that the patients who developed the condition on 6th October were likely to do so. To the best of my belief all the lesions in any one patient appeared at the same time, at all events there were no second "crops" or fresh lesions such as one could attribute to inoculation from areas originally involved. Each patch gradually cleared up; the gangrene shrank, but for days remained firmly adherent unless forcibly removed. The red areola became bluish, then faded, and became flat. A ring of suppuration appeared around the gangrene in two spots on M. F. This was the only case in which pus was seen. I thought, without actually having measured their size, that the spots on E. F—g. and M. F. enlarged during the day of October 5th. In the other cases any change in size after their first appearance was a decrease.

Every precaution was taken to check the spread of infection. The local treatment was very simple. Some sores were cauterised with liquid carbolic acid, cleansed with methylated spirits, and dusted with boracic acid. In others carbolic acid was not employed. Some cases for which I was responsible were merely dusted over, no other treatment appearing necessary.

Nothing conclusive was revealed by the bacteriological examination of the affected areas. Seven only of these cases were investigated. From spots on E. F—g., M. F., and E. F—n. smears were made on a cover-slip. Each showed a rather short bacillus which was decolourised when stained by Gram's method, and a Gram-staining coccus in very small numbers. From the moist gangrenous matter in

another spot on E. F—g. a streak culture on ordinary agar yielded a sparse growth of *Staphylococcus aureus*; a stab culture in glucose-agar proved sterile. From another spot MacConkey's medium was inoculated; this showed no growth after twenty-four hours, though kept at 37° C. I put the plate away in a drawer, but needing a MacConkey plate after a few days I took this one and found on it a few colonies of moulds and one of a Gram-staining staphylococcus, which was not investigated further than to show that it made a lactose and a litmus-milk medium acid. This colony was not unlike a *B. coli* growth. Another colony was the growth of a Gram-negative motile bacillus which gave the reactions of *B. typhosus* in litmus-milk, lactose, glucose, and MacConkey's liquid media. A third sub-culture of this bacillus did not agglutinate with strongly agglutinating serum. Yet another colony which was thought to be one of *B. typhosus* would not grow on transplanting.

From M.F., a stab-culture in glucose-agar from gangrene showed plentiful growth, with formation of gas, of a Gram-negative motile bacillus. This precipitated neutral red, with formation of gas, in MacConkey's medium, clotted milk, and produced acid and gas in lactose and glucose media. After two weeks it had not liquified gelatine. A bacillus similar to this was isolated from E. F—n. A streak on ordinary agar from a second spot yielded a solitary colony of mould. No cocci grew in media inoculated from these patients.

A gangrenous piece was removed from H. R., and planted surface up on a MacConkey plate. It proved sterile. The red zone around a second patch was cleaned of the superficial epidermis, and the serous fluid damping the surface was streaked on agar. This proved sterile,

but the spot had been cleansed with iodine before scraping. Similar attempts were made with M. C. H., P. H., and E. D. From the latter two *Staphylococcus albus* grew. E. F—g. and H. R. showed a few spots like deep-coloured “rose-spots,” which it was thought might be a pre-gangrenous stage of the condition. Smears on agar were made from these, but nothing grew. Except in the case mentioned the skin was cleansed only with soap and water. The spots faded and disappeared in a few days.

The diseased focus removed from M. F. was stained for micro-organisms in a variety of ways—by Gram’s method, methylene blue, thionin blue, and carbol fuchsin. No organisms were found in the tissues in a large number of sections examined. Histological examination of these sections showed an ulcer with steep sides extending into the true skin. Its floor was approximately at the level of the papillæ of the hairs. Both floor and walls were covered with a black, or brownish-black, structureless material. The epidermis at the edges of the ulcer was loosened from the corium beneath, its cells were swollen, their outlines lost, and their nuclei stained poorly or not at all. The connective tissues in the true skin beneath the ulcer had undergone hyaline change or cloudy swelling. The capillaries were congested, but there was little or no extravasation of red blood corpuscles. Here and there thrombosis in larger vessels was seen. Mononuclear and polynuclear leucocytes were fairly numerous, most numerous perhaps around the hair follicles.

To sum up then—in the severer cases, E. F—g. and M. F. and in E. F—n. bacilli were found belonging to the typhoid-coli group. In no other cases were these found. In these patients the gangrenous patches examined were moist, and as they might readily have become infected

subsequent to the parts becoming necrosed one cannot assume that the bacilli were the cause of the necrosis. Moreover, I am not aware that bacilli of this group cause gangrene when inoculated into the skin. Other organisms, when found, were staphylococci, aureus and albus, in very small numbers—either of which might have been found in equal numbers in any healthy skin. Pyogenic organisms certainly may cause gangrene, but there is suppuration as well, and the instances where this occurs are not of such favourable termination as those under consideration. More especially does this apply to streptococci, which in pure culture or with other organisms (such as *B. diphtheriæ*) are found in cancrum oris, noma, and gangrenous tonsillitis and pharyngitis. But neither are these conditions comparable to that under consideration, and, moreover, these organisms were found in no case examined. On the results of these investigations, then, it is impossible to draw any definite conclusion as to the microbic origin of the lesions.

Failure to find a fundamental explanation of the outbreak, however, must not deter one from advancing a possible one. The synchronous appearance of the lesions in a number of persons suffering from different diseases, the limitation of the lesions to the buttocks (except in two cases where they were low on the back), and the absence in every patient of signs of renal, pulmonary, or other infarction make it certain that the infection—for infection it surely was—was introduced from without. It was suggested that the tow used for cleansing the patients was at fault. There was certainly fair reason for entertaining this proposition, for a fresh supply of tow was brought into the hospital on the evening of 3rd October, and the dermatitis appeared only in those wards where tow from

this supply was used. And after this tow was banned some was used by an oversight in a ward hitherto free, and a case (J. L. referred to) occurred on 11th October. On the other hand, at least half of the patients cleansed with this tow presented no dermatitis, and repeated bacteriological examination of the tow showed the presence of no micro-organism other than the non-pathogenic *B. subtilis*.

Though differing from the cases already described in one important respect, a further case of gangrenous dermatitis must be reported with them. On 26th October a boy, A. F., aged three, was admitted as a case of typhoid fever under the care of Dr. Coleman. He was put in the women's ward, where the other cases, now nearly cured, were. The child was found to have severe broncho-pneumonia. On 29th October the ward-sister called my attention to a spot on the child's buttock. This lesion closely resembled those already described. But above this spot, and just above the crest of the ilium, was a little papule with a round vesicle on its summit. The contents of the vesicle were somewhat turbid. The papule was surrounded by a red area about one-quarter of an inch wide. In three days this lesion resembled those in the other cases; the mortified centre was dry and firmly adherent. The earlier appearing lesion had begun as a vesicle in every respect similar to this one. The child died on 2nd November.

As the unbroken vesicle made secondary infection a lesser probability in this case than in the others, one was justified in hoping for more conclusive results from bacteriological examination. The vesicle was opened accordingly with every precaution, and its contents inoculated on various media—blood-serum, agar, glucose-agar.

From all *Staphylococcus aureus* and *B. coli* were separated. Anaërobic cultures were made also, both by means of stabs in glucose-agar and by growing on various sloped media in an oxygen-free atmosphere. The same organisms only were found under these conditions. Some of the contents of the vesicle were inoculated (vaccination-wise) into the arm of a healthy man, with the result that there was a zone, about one inch in diameter, of hyperæmia and just noticeable swelling, which lasted three or four days. It was attended with considerable itching, but no other inconvenience. The sub-gangrenous matter of the other lesion was examined on corresponding media, and the same bacilli were found. After death the lesions were cut in sections; very few bacilli, but numerous cocci, were seen. The micro-organisms penetrated but a very short way into the living tissues. There was slightly more leucocytic infiltration than in the section from M. F., but no other noteworthy difference.

At the autopsy it was noticed that there were some two dozen purple-brown, oval, or roughly circular spots on the trunk. Their diameter was on an average that of a lead pencil. They were unlike the usual *post-mortem* discolouration, and were found in equal numbers on the abdomen and the back. Two of these were examined thoroughly for micro-organisms both in sections and as one would recover typhoid bacilli from a spleen, but none were found. In addition to the bronchi-pneumonia some ten ounces of flaky pus was found in each pleura, and about three ounces in the pericardium. Smears of these exudations showed an organism of the classical appearance of *Diplococcus pneumoniae*, but repeated attempts to isolate it failed. It was killed out by motile Gram-negative bacilli. The ubiquitous *B. coli* was isolated from both

pleural and pericardial pus. From the latter, in addition, a bacillus was separated, which on agar gave a slightly less opaque growth than *B. coli*. It grew freely in various media, but gave no characteristic reactions in any. In fact it altered no media. From the pleural exudate, besides *B. coli*, a bacillus was separated which fermented glucose and liquified gelatine. No other medium was altered. Five c.c. of swarming broth-cultures of these bacilli were injected with the interval of a week into the peritoneum of a rabbit—Dr. O'Sullivan kindly did this for me—with no appreciable result in the first instance. The rabbit ate little for three days after injection of the second culture, but otherwise was none the worse.

To make reference to the literature on gangrenous dermatitis may seem an undue weighting of my description of this inconsequential little epidemic. But inasmuch as I have found no parallel to it I would refer in a collective way to cases already described, and more especially to those which occurred in epidemics or in connection with acute disorders. The condition described first by Jonathan Hutchinson as varicella gangrenosa, and subsequently by several observers, will occur to every one's mind. That the Hardwicke epidemic does not come under this heading is evident, for the severity of the lesions was incomparably less grave than in varicella gangrenosa—the lesions were, in practically every instance, confined to the buttocks, and, above all, there were no signs of previous vesicles and pustules. In his original description of varicella gangrenosa Hutchinson refers to a paper by Whitley Stokes on gangrenous conditions of the skin. This account was published in the "Dublin Medical and Physical Essays" in 1807. It was a description of a disease well known throughout Ireland, but, though very

fatal, it had apparently attracted little notice from medical men, for till Stokes gave it the name pemphigus gangrenosus it had been known only by the unscientific, but none the less descriptive, names of "eating hives" and "the burnt holes." It appears, too, to have been much more successfully dealt with by women herbalists than by the profession. Stokes, unsuccessfully to my mind, tried to differentiate it from varicella, and Hutchinson is probably correct in assuming the identity of it and varicella gangrenosa. Hutchinson, Crocker, William Stokes, Haward, and others have recorded cases of multiple gangrenous dermatitis following vaccination.

The Hardwicke epidemic was most widespread in wards devoted to enteric and pneumonia. But, while a connection cannot be denied and is possible, the clinical history of the cases and the negative bacteriological findings give one no reason for associating the condition, especially with these diseases. But gangrenous dermatitis of a most severe nature has been described by Stahl complicating typhoid fever. Among a number of American soldiers suffering from enteric, and brought from various camps in the Spanish-American War, ten showed gangrenous dermatitis. Three of the ten died. Stahl gives reasons for regarding the lesions as embolic in origin, and in two cases that came to autopsy infarcts were found in the lungs, kidneys, and spleen. In these cases bacteriological examination of unbroken vesicles, which preceded the gangrene, showed staphylococcus (aureus and albus) and diplococci.

Cases have been recorded complicating erythema nodosum (Demme, quoted by Hartnell), in which a bacillus was found which, when inoculated into guinea-pigs, caused gangrene. Other cases reported by Mensi

and by Eichhoff complicated measles. From Mensi's case *Staphylococcus aureus*, and bacilli resembling *proteus vulgaris* and the diphtheria bacillus were separated. Inoculation of a mixture of the two first-named produced gangrene like the one they were recovered from. In Eichhoff's case the micro-organism found resembled *trichophyton tonsurans*.

There is abundant other literature on gangrenous dermatitis that need not be quoted. It all goes to show that multiple gangrenous lesions of the skin, where apparently infective and not obviously tropho-neurotic in nature, are due not to one special micro-organism acting on a body rendered less resistant by any special disease, but may be due to a variety of organisms, some of them well recognised and their usual action well known. These acting on soils of different suitability and (singly or in various combinations) with different degrees of virulence, may, perhaps, produce the less usual condition of gangrene. But as these factors are at present unmeasured the explanation, however reasonable, is purely hypothetical.

REFERENCES.

- (1) Boeck. *Archiv f. Dermat. und Syph.* 1882.
- (2) Crocker. *Med.-Chir. Trans. Lond.* 1887. LXX. 398.
- (3) Demme. *Fortschritte der Med.* Berlin. 1888. VI. 241.
- (4) Eichhoff. *Deutsche med. Wochensch.* 1884. X. 52.
- (5) Finny. *Dublin Journ. Med. Sci.* 1901. CXII. 401.
- (6) Hartzell. *Amer. Journ. Med. Sci. Phil.* 1898. N. S. CXVI. 43.
- (7) Haward. *Brit. Med. Journ.* 1883. i., 904.
- (8) Hutchinson. *Med.-Chir. Trans. Lond.* 1882. LXV. 1.
- (9) Janovsky und Mourek. *Archiv f. Dermat. und Syph. Wien.* 1896. XXXV. 359.
- (10) Mensi. *Gaz. Med. di Torino.* 1894. XLV. 361.
- (11) Stahl. *Amer. Journ. Med. Sci. Phil.* 1900. N. S. CXIX. 251.
- (12) Stokes (Whitley). *Dubl. Med. & Phys. Essays.* 1807.
- (13) Stokes (William). *Dubl. Journ. Med. Sci.* 1880. LXIX. 497.

DR. FINNY recalled a case he had shown some years ago at the Academy, which began in impetigo. It had ended fatally. He laid great stress in the search for a cause on the lowered resistance of the patients.

DR. DELAHODE and DR. DRURY described cases they had seen, the one of gangrenous dermatitis complicating vaccinia, the other of gangrenous dermatitis complicating varicella.