

roidectomized animal are very similar to those of paralysis agitans. In the picture of a monkey in this tetanic condition (v. Eiselsberg reproduced by Richardson¹⁰²) there are seen many resemblances to the characteristic position of a patient with paralysis agitans: the head and back bent forward, the joints of the extremities in flexion, the general appearance of rigidity and even the ulnar deviation of the hands. So far as I know, Lundborg¹⁰³ in 1904 was the first to call attention to the resemblance between the symptoms of paralysis agitans and the effects of parathyroidectomy in animals, and he arrived at the conclusions that "paralysis agitans is probably a chronic, progressive hypoparathyroidismus." Berkley¹⁰⁴ also noted this similarity in symptoms and reports eleven cases of paralysis agitans treated with parathyroid extract, nine were benefited and he refers to one very early patient who considered himself cured. These results of Berkley assume more importance in throwing light on the pathogenesis of the disease when we recollect the uniformly discouraging results of treatment with the other glandular extracts. Neither Lundborg or Berkley had any pathologic evidence to support their conclusions.

I was able to examine the parathyroid glands from two of my cases, and in the opinion of Dr. Allen J. Smith, professor of pathology at the University of Pennsylvania, they were both in a distinctly pathologic condition. In one there was some colloid material which, according to Welch, indicates a degenerative condition, but in both these cases there was a peculiar infiltration with fat, especially in relation to the blood vessels. This pathologic evidence of disease of the parathyroid in paralysis agitans, when considered together with the experimental evidence quoted and the therapeutic results of Berkley, suggests that the parathyroid glands play an important part in the pathogenesis of paralysis agitans.

CONCLUSIONS.

1. Paralysis agitans is not a neurosis nor is it senility.
2. The anatomic basis of the symptoms, muscular rigidity, tremor, and the symptoms dependent on them, lies in the affection of the muscles.
3. The disease itself is probably a general toxemia and there is suggestive evidence that it is due to alteration in the secretion of the parathyroid glands.

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DISCUSSION.

Dr. D. J. McCarthy, Philadelphia, said that he does not agree with Dr. Camp in describing this condition as a purely muscular disease. While the theory, of course, of inelasticity of the muscles will hold good in certain directions, yet there are certain nervous manifestations which, he thinks, can not be explained by the condition of the muscles. The loss of elasticity, of course, will explain a decrease, but the reflexes are often increased, and it will not explain the tremor. It does not explain the sensory and trophic disturbances so often noted. The changes in the nervous system bear a more intimate relation to the disease than the changes in the muscles. In reference to Dr. Camp's statement that the disease is not one

which occurs in the young, Dr. McCarthy recalled a case in which paralysis agitans developed before the patient, a man, was 30 years of age. The individual had worked in lead for many years from boyhood, and before the development of the disease he had extensive arteriosclerosis.

Dr. C. D. CAMP, Philadelphia, said that the anatomic basis of the muscular rigidity and the tremor in paralysis agitans is in the muscles; as against this Dr. McCarthy has mentioned exaggeration of the knee jerks, but most observers are agreed that the knee jerks are generally normal in this affection. There is no reason why the same influence or toxin that produces the degenerative change in the muscles should not also produce secretory and other similar symptoms. The origin of this toxin is not known, but Dr. Camp called attention to the evidence which seems to connect it with the parathyroid glands, and to the very suggestive changes in the parathyroid glands found in his cases. The pathologic conditions in the central nervous system are the changes of senility; they are not constant in paralysis agitans, and they are found in old people who during life had none of the symptoms of paralysis agitans. It is generally agreed that the tremor in the disease is caused by some lesion in the neuromuscular mechanism that regulates muscle tone, but in sleep the muscles are relaxed and consequently the tremor stops. Muscle tone is increased on excitement, so is the tremor. It is evident that the cerebrum has a marked influence on muscle tone, but while such impulses probably originate there, the perversion which causes the tremor may be due to a lesion either in the spinal cord or in the muscles where they are received. There is no necessity for the perversion to occur at their origin; in order to act normally the impulses must be normally transmitted and received, but a lesion in the internal capsule by completely stopping all impulses naturally stops the tremor. This explains those cases in which a tremor affected all four extremities, but after the occurrence of the hemiplegia the tremor stopped on the paralyzed side.

ACUTE OTITIS MEDIA.*

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The various forms of otitis media depend not only on their varied etiology but also on their management and treatment. They depend also on the systemic condition of the patient as well as on the duration of the disease.

ETIOLOGY.

A few cases are the result of direct injury, but the greatest number are the result of a specific infection, and are usually secondary to some nasal or pharyngeal disease, such as catarrh, adenoids or Eustachian tube disease, which is usually secondary to nose or throat disease. Nasal obstruction is an extremely frequent cause of otitis media, because it interferes with the ventilation of the Eustachian tube, and stenosis of the tube means an inability of the middle ear to drain itself. By this means various bacteria, pathogenic and otherwise, gain entrance into the middle ear and set up an inflammation. Chilling of the body and ill advised baths, as river bathing out of season, is also a frequent cause of otitis media.

But besides the Eustachian tube there are two other ways by which bacteria may gain entrance to the tympanic cavity, namely, by the external canal through a perforated drum, and by way of the blood and lymph stream. The latter, however, is very rare, but sometime occurs in syphilis. We assume and believe that every case of otitis media is the result of a bacterium of some

103. Deutsch. Ztschr. f. Nervenheilk. 1904.

104. Med. News, Dec. 2, 1905.

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kind. Bacteria may be found in any and all throats and noses, and yet if the Eustachian tube is healthy and properly performs its functions of ventilation and drainage, the middle ear is apt to escape injury, especially if there is no systemic disease to lower the local resistance. The systemic condition may influence the form of trouble as well as the progress and prognosis of the case.

Simple otitis media may result from any of the foregoing causes, and is known by the following pathologic conditions: swelling, redness, infiltration and exudation of the intra-tympanic mucous membrane and patches of broken down epithelium. The bony wall also partakes of this pathologic state. The exudate contains mucous, blood and sometimes pus and various bacteria and varies in color accordingly.

SYMPTOMS AND COURSE.

The important symptoms are paroxysmal pulsating pain in ear and face, worse toward evening; in children often accompanied by high fever, delirium and convulsions. On examination with the speculum or, what is better, Seigle's otoscope, we find the drum is red and bulging, if it is not badly retracted from former diseases. Especially is this true of its postero-superior-quadrant. As a rule, all the landmarks are obliterated except the short process which appears as a yellow spot. The hearing is rapidly impaired.

If the case runs a favorable course the pain and redness of the drum grow gradually less in three or four days, though the hearing may be unimproved, but recovery takes place in about four weeks. This condition is distinguished from myringitis by the greater impairment of hearing and increased tympanic distension. If it runs an unfavorable course it may last indefinitely.

TREATMENT.

In the acute simple otitis media this consists of alleviating the pain and treating the nose and throat with cleansing antiphlogistic agents, to facilitate drainage and ventilation to the tympanum by the Eustachian tube as soon as possible. The pain is best relieved by instilling within the external canal a 4 per cent. solution of cocain, preceding it with a douche of hot boric acid solution; having the patient lie on the opposite side to the one affected, and then applying heat and repeating the douche and cocain frequently if necessary. If the bulging of the drum and the pain increases after thirty-six hours treatment, then do a myringotomy and drain thoroughly, making the incision in the most dependent part of the bulged portion of the drum, which will usually be found in the postero-inferior-quadrant. Myringotomy can be done without pain after the instillation of a 10 per cent. solution of cocain with a 1-1,000 solution of adrenalin. If the drum is not incised it will finally rupture and slough with ragged edges and frequently does not close, leaving the ear exposed to the constant danger of infection. By relieving the intra-tympanic pressure and tension of the membrane by means of the incision the nutrition and reparative power of the drum are preserved, and, as any clean-cut wound will heal more quickly and surely than one made by sloughing, we shall, therefore, lessen the danger of permanent perforation. But more important than all, by early incision we lessen the danger of bacterial invasion of the mastoid cells with its consequent mastoiditis. The cavity should be evacuated and good drainage kept by aspiration and by douching with warm antiseptics.

Hydrogen peroxid may be used as a cleansing agent and the ear mopped out with dry cotton until it is perfectly clean; then with a hand powder-blower fill the canal one-third full of boric acid and insert cotton. This treatment and dressing should be performed by the doctor or nurse, otherwise it is poorly done. When the discharge has ceased use 10 per cent ichthylol in liquid petrolatum instead of the powder and continue until the drum is healed, during which time the nose and throat must be constantly treated. We now begin with special measures to restore hearing, then after each nasopharyngeal treatment we practice Politzerization, which has for its special object free ventilation of the tympanic cavity. Do not depend on the family for any part of the treatment; if you do you will fail. If tympanic ventilation is interfered with by stenosis of the Eustachian tube it must be opened or closing of the drum will not take place, and then we must remove any and all naso-pharyngeal obstructions, such as adenoids, enlarged tonsils, septal spurs, enlarged turbinates, polypi, deviated septum, etc. If there is simply a Eustachian salpingitis we may have to resort to bougies. As these naso-pharyngeal abnormalities are the greatest cause of tympanic disease, as well as of many other troubles, it is far more expedient to remove them than to wait and only partially succeed in restoring the middle ear after it has been disturbed by these abnormalities. Every pathologic pharyngeal condition promptly treated as it arises will greatly reduce chronic middle-ear disease.

PROGNOSIS.

In simple acute otitis media the prognosis is good if the trouble is properly treated early and continuously. If it is neglected for two or three weeks it goes on to perforation, partial destruction of the middle ear, and may merge into chronicity. This, if it occurs, is troublesome to deal with and often involves the mastoid. In neglected perforative otitis media, which is apt to involve the accessory cavities and mastoid cells, we have a disease which is most serious, and yet parents, and sometimes physicians, will say, "Oh, the child will outgrow it, and you can't treat it successfully anyway." Why not say the child will outgrow a broken leg or a depressed skull or a cleft palate. It is nearly as rational. It is a formidable and difficult disease with which to deal, and owing to its intra-osseous location it becomes necessary to be persistent and aggressive and sometimes radical in its treatment, and often mastoidotomy is a conservative instead of a radical mode of treatment.

In cases of acute purulent otitis media and mastoiditis what are the purposes of opening the mastoid? First, to promote better drainage; second, to limit the extension of the infection; third, to remove necrosed bone and promote early healing. The indications for opening the mastoid in acute mastoiditis are: First, tenderness over the antrum, persisting for three days, after freely incising Shrapnell's membrane. Second, if the discharge from the ear suddenly grows much less while other symptoms remain, with an elevation of temperature, chills and sweats, denoting the opening up of the new channels and fields of infection. Third, a flow of pus too great to have been produced by so small a cavity as the tympanus, indicating invasion of the cells. Fourth, many surgeons regard a bulging of the postero-superior wall of the canal as a positive sign of mastoid disease and indicating interference; a few say it sometimes occurs with simple otitis media.

It seems rational to make it a rule to at least drain and remove necrosed bone in every case of true purulent mastoiditis, and although many cases recover without interference, it is certainly a long, tedious and dangerous route. To say the least, such patients should be under the immediate attention of a surgeon until recovery is complete. Like appendicitis, its progress is insidious and its ravages hidden to an ordinary observer, until the mastoid has been explored and if mastoid surgery fails, it is usually because it has been postponed too long or the exploration has not been thorough and some foci of infection have not been found. The way to success in otology is to never let an acute otitis become chronic.

As the general practitioner is apt to see the case first it behooves him to be vigilant and prompt in treatment and advice, so that no time be lost, for the earlier pathologic condition is much more amenable to treatment and yields a more pronounced success, while neglected cases last a long time and have an uncertain outcome.

DIFFERENCES IN THE PHYSIOLOGIC ACTION OF THE SALTS OF AN ALKALOID.*

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Whether or not all the salts of an alkaloid, when the differences in their solubilities are excluded, have the same physiologic action is a question which is usually evaded in text-books on pharmacology and therapeutics. It is the general opinion that all the salts of an alkaloid, in the doses in which they are ordinarily administered, do have, aside from the local effect due to differences in solubility, the same action. Cushny,¹ speaking of the excessively bitter taste of quinin, says that it may be prescribed as a salt of tannic acid. This salt is exceedingly insoluble and is consequently almost tasteless. The pure alkaloid may be advantageously used for the same purpose and for the same reason. Where a rapid action is desired, a freely soluble salt—as the hydrochlorid, the bisulphate or the hydrobromate—is usually employed. Such salts as the above are the ones which are usually chosen for hypodermic administration. The only questions considered are whether it is sufficiently soluble and whether it is non-irritating.

Such statements are a fair example of the ordinary text-book descriptions of the different actions and indications for the use of the various salts of an alkaloid. It is not uncommon, though, for a physician to use one salt of an alkaloid to the exclusion of all others, because he believes he gets better results with it, while another doctor may be of the same opinion regarding a different salt of the same alkaloid. One point which the average physician may tend to ignore is that when a definite quantity of the salt of an alkaloid is given, unequal amounts of the alkaloid are administered. For example, when one-sixtieth of a grain of strychnin hydrochlorid is administered, more of the pure alkaloidal strychnin is given than when a sixtieth of a grain of strychnin salicylate is dispensed.

I have long been of the opinion that it is probable, especially with those alkaloids which are administered in considerable quantities, that there are different quan-

titative effects depending on the acid with which the alkaloid is combined.

TABLE 1.

Solutions Used:	C.C. of Oxygen Freed in					
	M/8		M/64		M/512	
	2 m.	5 m.	2 m.	5 m.	2 m.	5 m.
Sodium nitrate.....	0	0 1/4	0	0 1/2	4	7
Sodium chlorate.....	0 1/2	1	1	3	3	5
Sodium formate.....	1	2	1	3	3	7
Sodium chlorid.....	1	3	7	15	14	33
Sodium fluorid.....	2	4	4	9	4	9
Sodium bromid.....	4	8	9	18	13	31
Sodium sulphate.....	11	24	12	25	14	32
Distilled water.....	14	32	14	33	14	33
Sodium sulphite.....	19	35	14	31	13	34
Sodium acetate.....	26	53	30	55	25	48
Sodium hyposulphite.....	30	60	20	42	14	33
Sodium succinate.....	31	60	32	55	16	36
Sodium butyrate.....	42	60	33	60	14	35
Sodium valerianate.....	42	60	39	65	24	50
Sodium butyrate.....	45	55	37	52	35	50
Sodium oxalate.....	40	70	44	65	12	33
Sodium citrate.....	42	71	45	75	14	38
Sodium phosphate.....	40	70	55	..	20	35
Sodium carbonate.....	50	..	50	..	40	70

TABLE 2.

Solutions Used.	C.C. of Oxygen Set Free in							
	N/100		N/500		N/2500		N/10000	
	2 m.	5 m.	2 m.	5 m.	2 m.	5 m.	2 m.	5 m.
Strychnin nitrate...	2	15	4	20	5	25	6	30
Strychnin chlorid...	8	36	8	38	9	40	8	37
Distilled water.....	9	36	..	..	..	..	..	..
Strychnin (purum).....	..	..	11	42	8	36	9	37
Strychnin phosphate.....	10	38	10	39	9	36	8	36
Strychnin citrate.....	12	43	13	40	11	47	8	38
Strychnin sulphate.....	18	56	10	35	10	42	9	38
Strychnin arsenate.....	20	58	11	44	10	43	10	37
Strychnin valerianate.....	24	49	28	60	17	55	15	60
Strychnin salicylate.....	..	..	25	60	10	46	8	35
Strychnin acetate.....	35	70	29	58	13	41	9	36

TABLE 3.

Solutions Used.	C.C. of Oxygen Set Free in									
	N/100		N/500		N/2500		N/10000		N/25000	
	1 m.	2 m.	1 m.	2 m.	1 m.	2 m.	1 m.	2 m.	1 m.	2 m.
Caffein nitrate.....	..	..	..	..	1	6	5	18	7	25
Caffein sulphate.....	..	1	..	2	2	7	5	26	9	36
Caffein salicylate.....	..	2	..	6	6	30	8	35	9	37
Caffein bromid.....	..	1	1	5	5	25	7	30	8	32
Caffein chlorid.....	..	..	1	6	7	30	8	35	9	36
Caffein citrate.....	..	1	2	7	5	17	8	34	9	36
Caffein arsenate.....	1	2	3	7	6	32	7	33	9	36
Caffein benzoate.....	1	7	4	15	7	25	8	35	9	37
Caffein valerianate.....	2	12	6	26	8	34	9	36	9	37
Caffein (purum).....	10	40	10	39	9	38	9	37	10	36
Distilled water.....	9	36	..	..	..	..	..	..	..	..

Apropos of some work² which I was doing with Nielson on the effects of various salt solutions on enzymatic and catalytic action, the various obtainable salts³ of strychnin and caffein were also tried in the same way. In tables Nos. 1, 2 and 3 are given the results of a list of sodium, of strychnin and of caffein salts, respectively, on the splitting of hydrogen dioxid by a watery extract of kidney or pancreas. These tables are introduced for the sake of making a comparison of these results with those which are given in the experimental portion of the paper.

* From the Department of Physiology of St. Louis University.

1. Cushny: Text-book of Pharmacology and Therapeutics, 3d edition, p. 368.

2. Nielson and Brown: Am. Jour. of Phys., vol. xli, 1904, p. 374.

3. Brown and Nielson: Ibid., vol. xlii, 1905, p. 427.