this was seized with very slender catch forceps and pulled upward. By so doing, however, the dyspnea at once became great, and it was evident that the gland could not be pulled through the bony ring of the chest aperture without causing alarming compression of the trachea. I tried to pull the sternum forward with the aid of stout hooks, but it was unyielding. I then split the manubrium in its middle by a vertical incision with a bistoury and was now able, with tenacula, to pull each half of the sternum sufficiently forward to allow the coming manipulation to take place without special danger to the trachea. The next step consisted in freeing the capsule of the enlarged thymus from the surrounding structures by working a curved director slowly and cautiously over the whole surface, dividing the delicate fibers holding the gland in place. The left half of the gland was now removed in three or four parts, the tissue breaking very readily. A small piece of the left lobe was left for physiologic reasons. The right half was then lifted out from the mediastinum and removed *in toto*. The bleeding was rather insignificant and was stopped with a gauze packing. Immediately after the delivery of the gland the respiration became perfectly easy and peaceful. Each lobe of the gland measured $1\frac{1}{2}$ by 1 by 1 inch, so that the two lobes together formed an organ about $1\frac{1}{2}$ inches long, 2 inches wide and 1 inch thick. Microscopic examination showed simple hypertrophic and no other pathologic change. Attention was now paid to the thyroid enlargement. The upper flap was dissected back together with the platysma as far as the larynx; the fascia binding together the sternohyoid and sternothyroid muscles was split vertically from larynx to the sternal notch, the muscles stripped back on either side and thus the thyroid exposed to full view. The enlargement was found to belong to the left lobe and this was resected in the following way: A needle armed with chromicized gut was thrust through the parenchyma close to the posterior capsule, thus saving parathyroid glands as well as the recurrent laryngeal nerve, and the gland was tied off in three sections, a piece as large as a small walnut being removed altogether. The upper flap was now drawn down and sewed to the lower with horsehair and a small gauze drain inserted into the thymic recess led out through the middle of the incision.

Postoperative History.—The baby stood these two operations admirably; there was no shock nor fever and the wound healed by first intention. On the eighth day after operation the patient was discharged and has been very well up to the present time, having gained three pounds since the operation.

SURGICAL CONSIDERATIONS.

The operation should be performed as soon as a diagnosis is made, the radiographic method being the most reliable of our diagnostic means. A tracheotomy should be provided for in every case, but avoided if possible on account of the danger of infecting the mediastinum. The upper chest aperture should be temporarily enlarged by the splitting of the sternum, if during the operation the dyspnea is increasing at all; in this way it will be possible to avoid tracheotomy in a number of cases. General anesthesia should be used, as it is very difficult to operate on a struggling child.

THE CONJUNCTIVAL TUBERCULIN REACTION.*

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Since the original articles of Wolff-Eisner, Vallée and Calmette appeared describing an inflammatory reaction of the conjunctiva following the instillation of tuberculin solutions into the conjunctival sac, a wealth of literature has accumulated in regard to the experiences of various investigators with this important test. Many

that have employed the test have most enthusiastically proclaimed it simple, reliable and absolutely harmless. Unfortunately others have had less satisfactory results from its use and have stated that it is unreliable as a diagnostic measure and at all times dangerous, entailing risk of serious ocular damage.

Notwithstanding the condemnation which it has received it seems, judging from the literature, that the test is of great value and one that will be used extensively. Inasmuch as definite conclusions may be drawn only from data obtained under different conditions, I have felt it worth while to add my observations to those already recorded.

In my cases I have employed a $\frac{1}{2}$ or 1 per cent. solution of Koch's old tuberculin, the dilution being made with sterile distilled water or more commonly with sterile physiologic salt solution. I have studied in all 189 individuals—109 adults and 80 children. I shall discuss the results in children and adults separately.

THE REACTION IN ADULTS.

The results in sixty-eight adults either tuberculous or probably so are shown in Table 1.

Condition of Patient.	Stage.	No.	+	0
1. Positively tuberculous, (bacilli in sputum)	Incipient	6	5	1
	Moderately advanced	21	16	5
	Far advanced	22	12	10
	Total	49	33	16
2. Probably tuberculous	Incipient	7	4	3
	Moderately advanced	3	3	0
	Far advanced	9	4	5
	Total	19	11	8

No case was considered positively tuberculous unless tubercle bacilli were demonstrated in the sputum, even if the case gave unmistakable evidence of disease. Of the tuberculous or probably tuberculous about 65 per cent reacted positively. That the incipient and moderately advanced cases show a higher percentage of reactions than those far advanced has been observed by many. My results also illustrate this fact as shown in this summary:

Stage.	Number Examined.	Per cent. of Reactions.
Incipient	13	69
Moderately advanced	24	79
Far advanced	31	51

The test was tried in forty-one individuals who either were suffering from some non-tuberculous lesion or were normal. The results are given in Table 2.

Condition of Patient.	No.	+	0
Typhoid fever	14	7	7
Pneumonia	2	..	2
Unresolved pneumonia	1	..	1
Influenza	1	..	1
Gonorrheal arthritis	4	..	4
Cerebral syphilis	1	..	1
Tertiary syphilis and aneurism	1	..	1
Aortic aneurism	1	..	1
Emphysema and bronchitis	2	1	1
Emphysema and asthma	1	..	1
Bronchitis and valvular disease	1	..	1
Pernicious anemia	1	..	1
Sciatica	1	..	1
Emphysema	2	..	2
Myocarditis	1	..	1
Angiocholitis	1	..	1
Diabetes	5	..	5
Normal	1	..	1
Total	41	8	33

It is very noteworthy that of fourteen cases of typhoid fever seven, or 50 per cent., reacted positively. S. Cohn¹ first called attention to the fact that typhoid patients frequently responded to this test, noting eight positive

*From the Department of Research, Chicago Tuberculosis Institute.

1. Berlin. klin. Wchnschr., 1907, No. 47.

reactions among twelve cases examined. Levy² observed one positive reaction in three cases of typhoid. He states that in the positive cases examined by himself and those of Cohn and Eppenstein the patients were convalescents, all febrile cases failing to respond. My observations were made on febrile cases only, hence it is apparent that the reaction may occur during the active stages of the disease as well as in convalescence. Cohn explains the reaction in typhoid on the score of a hypersusceptibility on the part of the typhoid patient to the bacterial albumin in the tuberculin.

The results obtained in this series of cases support the views held by many that the conjunctival tuberculin test when properly applied is of value in the diagnosis of tuberculosis. It is more reliable early in the disease than in the advanced stages. The reaction is not specific and is not of service in the differential diagnosis between typhoid fever and tuberculosis simulating typhoid fever. In no case should a positive conclusion be based on the result of this test alone.

THE REACTION IN CHILDREN.

In conjunction with Dr. Ethan A. Gray I have applied the conjunctival tuberculin test to eighty children in the Chicago Nursery and Half Orphan Asylum. The children ranged in age from 6 months to 14 years.

A thorough physical examination was made of each child. Signs regarded as possible evidence of tuberculosis—either latent or active—were: Imperfect development, loss of weight, supra- or infra-clavicular depressions, flat chest, winged scapulae, palpable cervical or axillary glands, scars from previously infected glands, dilated venules over suspicious areas, deficient respiratory action, prolonged high pitched expiration over the apices, râles at the apices, vertebral bronchophony or whisper, imperfect percussion note over the apices.

When all of these signs were absent the case was considered non-tuberculous. When one or two were present it was regarded as suspicious. If several were demonstrable it was classed among the very suspicious. The results of our examination are given in the following table:

TABLE 3.

Age of Patient.	Condition.	No.	+	..
From 6 months to 2 years (incl.)	Normal	7	..	7
	Suspicious	8	..	8
From 3 years to 6 years (incl.)	Normal	8	..	8
	Suspicious	14	..	14
	Very suspicious	1	1	..
From 7 years to 14 years (incl.)	Normal	8	..	8
	Suspicious	23	6	17
	Very suspicious	10	5	5

It will be noted that there was no positive reaction in twenty-three perfectly normal children. With increase in the evidences of tuberculosis there is an increase in the percentage of positive conjunctival reactions. This fact is well brought out by the following summary:

Condition.	No.	+	Per cent. +
Normal	23	0	0
Suspicious	45	6	13½
Very suspicious	12	6	50

These results indicate that the conjunctival reaction when present in a child is an additional evidence of tuberculosis. Comby,³ after testing 300 children, concluded that the conjunctival reaction is of great service. Four positive and six negative cases examined by him came to autopsy and in each case the result of the test was confirmed.

VERY SEVERE REACTIONS.

As stated, some consider the tuberculin conjunctival test dangerous because of the occasional appearance of very severe reactions and suggest that it should be abandoned or its use much restricted for that reason. It seemed worth while to examine the literature to determine, if possible, the frequency of the very severe reactions. In this attempt I have met with much difficulty inasmuch as many authors have made only incomplete reports, omitting essential details. Two preparations of tuberculin have been commonly used, namely, precipitated tuberculin (Calmette's) and diluted old tuberculin.

Precipitated Tuberculin.—Calmette advised the precipitation of the tuberculin with 80 per cent. alcohol, thus avoiding the irritating action of glycerin and other substances present in tuberculin not essential to the test. The precipitated tuberculin has been prepared by many investigators for their own use. The great majority, however, have used solutions made from tablets, or serum tubes, put out by different laboratories, the chief of these being the Pasteur Institute in France, the Höchst Laboratory in Germany, and the laboratory of Parke, Davis Co. of Detroit. I have found no direct criticism of the French and American preparations. That originally placed on the market by the Höchst laboratory was determined to be at least ten times too strong, since the weight of the dry powder was used as the basis for dilutions and not that of the original tuberculin solution. The firm now recommends that when their dry preparation is used a 0.1 per cent. solution and not a 1 per cent. should be employed.

Old Tuberculin.—Eppenstein⁴ instilled into many eyes a drop of a 2 per cent. glycerin solution and reaction did not follow. He concluded that the presence of glycerin in old tuberculin would not be irritating to the eye. MacLennan⁵ made a similar experiment, using a solution of 1 per cent. phenol and 1 per cent. glycerin. Reactions did not follow. Wolff-Eisner⁶ states that the precipitated tuberculin contains the same poisons as the original old tuberculin. Many now recommend the use of a 1 per cent. solution of old tuberculin—Wolff-Eisner,⁶ Treupel,⁶ Schröder and Kauffmann⁶—and if the contained glycerin and other substances do not complicate the result it would seem for many reasons to be the best preparation for the work.

I have tabulated the results of various observations as they bear upon this question of very severe reactions. It must be stated that by a very severe reaction is meant one in which the conjunctivitis is accompanied by chemosis, keratitis or corneal ulcer; cases followed by general reaction unless accompanied by very severe local inflammation are not included in this review. The results obtained by the use of the precipitated tuberculin as first recommended by the Höchst Laboratory were by no means mild, as is well shown in Table 5.

TABLE 5.—HÖCHST ORIGINAL PRECIPITATED TUBERCULIN.

Author.	Number Examined.	Per cent. Tuberculin.	Very Severe.	Remarks.
Klieneberger	61	1. (10%)	5	Authors regard all due to the preparation used.
Wiens and Gunther	12	1. (10%)	4	
Wiens and Gunther	38	.5 (5%)	2	
Total	111		11	

It will be noted that 10 per cent. of the cases in which this preparation was used gave very severe reactions. Schmidt also reported a severe reaction, and

2. Deutsch. med. Wchnschr., 1908, No. 3.
3. Presse Méd., 1907, xv, 64, p. 506.

4. Med Klinik, 1907, No. 36.
5. Brit. Med. Jour., 1907, ii, 1643.
6. Münch. med Wchnschr., 1908, No. 2.

Wolff-Eisner and Wolff considered this preparation too strong. The results following the employment of Koch's old tuberculin are given in Table 6.

TABLE 6.—DILUTIONS OF KOCH'S OLD TUBERCULIN.

Author.	Number Examined.	Per Cent. Sol.	Very Severe.	Remarks.
Schröder and Kauffmann...	77	1	0	"Entirely harmless."
Mainini	100	5	0	"Entirely harmless."
Levy	330	2 and 4	2	Once or twice noticed severe reaction following the use of 4 per cent. solution.
Mac Lennan.	25	1	0	
Kobler	175	1, 2 and 4	0	
Schenck and Seiffert	100	1, 2 and 4	3	Following use of 4 per cent. solution.
Schenck	100	0.5	0	
Clark	189	0.5 and 1	0	
Total	1096		5	

In this series five very severe reactions occurred and these followed the employment of 4 per cent. solutions. The harmlessness of the more dilute solutions is apparent.

The next table (7) includes results from the use of precipitated tuberculin (Calmette's).

TABLE 7.—PRECIPITATED TUBERCULIN.

Author.	Number Examined.	Per cent. Sol.	Very Severe.	Remarks.
Meille	18	1	0	
Mac Lennan...	57	1	0	
Mac Lennan...	20	0.5	0	
Eyre, Wedd and Hertz	138	1	0	
Stephenson...	30	1	0	
Nance and Swift	22	1	1	P. D. & Co's prep. There was previously a phlyctenular ulcer of other eye.
Smithies and Walker	242	1	1	P. D. & Co's prep. One mg. T. A. given subcutaneously previous to instillation.
Total	527		2	

In many reports the details were incomplete and these are given in a separate table (8).

TABLE 8.

Authors.	Number Examined.	Per cent. Sol.	Very Severe.	Remarks.
Etienne	150	?	0	
Rénon	28	1	3	Preparation not stated.
Wolff	64	0.5 & 1	2	Preparation not stated.
Napier	?	?	2	In both cases tuberculin given previously.
Downes	22	?	0	Preparation not stated.
Baldwin	137	?	0	Preparation not stated.
Total	401		7	

Omitting those cases in which the original Höchst preparation was used and those recorded by Napier, who did not mention the number examined, we have 2,024 cases in which number occurred twelve very severe reactions. Five of these followed the instillation of a 4 per cent. solution of tuberculin. Those reported by Napier, Smithies and Walker were probably due to the use of subcutaneous injections previously or subsequently and the results were due to acquired hypersusceptibility. In 918 cases in which a 1 or 0.5 per cent. solution of Koch's old tuberculin or precipitated tuberculin were used but two violent reactions occurred—about 1 to 450.

Lapersonne⁷ investigated six very severe reactions and concluded that this test is not a source of danger to the eye, and the rare cases in which accidents have occurred simply call for some counsels of prudence. He says that a thorough examination of the eye should first be made. In all but one of the six cases which he investigated there was pre-existing disease of the cornea. In no case was vision impaired. Morax⁸ thinks it is only dangerous to previously diseased eyes.

Calmette⁹ states that by using sterile solutions and by employing irrigations or compresses in those cases which react sharply or longer than usual serious consequences can be avoided. Previous disease of the eye, he thinks, demands the advice of an ophthalmologist, and the test should not be used in the aged. Delorme,¹⁰ however, considers hypersusceptibility the underlying factor in violent reactions, and since this can not be predicted the test must be considered a dangerous procedure.

It is obvious, then, that the views on this phase of the subject are various, probably to a great extent because different strengths of tuberculin and different technics have been employed. The conclusions to be drawn from the tables of results are that if a 0.5 or 1 per cent. solution is employed, preferably of original old tuberculin, in individuals free from previously diseased eyes there will be little danger. Hypersusceptibility, if natural, can not be foretold; acquired hypersusceptibility—by repeated instillation into the eye, or subsequent subcutaneous injection of tuberculin, should be avoided where possible, for it has been the experience of many that reactions under such circumstances are very frequently severe. Cohn,¹ Levy,² Rosenau and Anderson¹¹ give indisputable evidence that a positive reaction following repeated instillation into the same eye is not of diagnostic worth, but is simply an evidence of acquired hypersusceptibility, an additional reason why second instillation should be abandoned.

In conclusion I desire to thank Dr. Ethan A. Gray and the resident staff of Cook County Hospital for their kindness in offering material for the investigation of this test.

Clinical Notes

LIGATION OF PORTAL VEIN FOR HEMORRHAGE DURING OPERATION ON HYDATID CYST OF THE LIVER,

WITH A STUDY OF THE RELATION OF URINARY EXCRETION TO HEPATIC FUNCTIONS.

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The object of this communication is to report and place on record the history of a case in which the portal vein was ligated during an operation for hydatid cyst of the liver. So far as we have been able to ascertain, the case is unique in surgical history. As there were practically no disturbances of nutrition following the operation, and as the patient made a prompt and satisfactory recovery, a series of investigations was undertaken to see what, if any, abnormalities existed in the daily excretion of urine.

Patient.—A woman, 38 years of age, was admitted to the Roosevelt Hospital suffering from an epigastric tumor with periodic attacks of pain in the right hypochondriac region.

History.—This was negative up to three months before ad-

7. Presse méd., 1907, xv, 797.

8. Bull. et mém. Soc. Méd. d. hôp. de Par., 1907, 3, xxiv, 1313.

9. Bull. de l'Acad. de Méd., Feb. 4, 1908.

10. Bull. de l'Acad. de Méd., Feb. 11, 1908.

11. THE JOURNAL A. M. A., March 21, 1908, 961.