

## THE OPSONIC INDEX IN ERYSIPELAS.\*

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AN increase in the streptococcal opsonin during the course of erysipelas has been observed by G. F. Ruediger.<sup>1</sup> Two cases examined by me<sup>2</sup> showed a rise as the symptoms subsided. Schorer<sup>3</sup> found no constant change in the streptococco-opsonic index corresponding with desquamation and recovery in two cases in which several estimations were made. In neither case did he make daily examinations. A composite chart of 36 cases observed by Schorer shows that erysipelas causes an increase in opsonin which reaches its height about the third day of the disease and then falls gradually to normal. Two cases examined by him on the first day of the disease had indices of 0.6 and 0.3.

In order to ascertain whether the streptococco-opsonic index follows a definite course during an attack of erysipelas, I have made daily examinations in several cases. A typical *Strept. pyogenes* isolated from a case of otitis media in erysipelas was employed for the suspension. In the routine examinations the opsonic indices were estimated in the usual way and after incubation of the mixtures at 37° C. for 15 minutes.

Ten patients have been examined. Isolated examinations were made in five cases. Five patients, one during three attacks, were examined as a rule daily during the course of the disease. It appears from the results that the index corresponds with the clinical symptoms rather than with the day of the disease. Of eight cases examined during the early period of the attacks, six had indices below normal ranging from 0.2-0.7, one patient had an index of 0.83, and another of 1.1. In all of the patients examined later in the disease except in a fatal case (Chart 2), there was found to occur with the fall in temperatures and improvement in the symptoms a rise in the streptococcal index varying from 1.4 to 4.4 (Chart 1), the average highest point

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<sup>1</sup> *Jour. Infect. Dis.*, 1907, 4, p. 304.

<sup>2</sup> *Jour. Amer. Med. Assoc.*, 1906, 46, p. 108.

<sup>3</sup> *Amer. Jour. Med. Sci.*, 1907, 134, p. 728.

being 2.0. This rise was followed by an abrupt fall to normal in from one to three days. The serum of the patient with two recurrences showed with the onset of each a subnormal index, followed by a rise as the symptoms subsided (Chart 3).

In one case the opsonic indices were determined with respect to staphylococcus, the pneumococcus, *Strept. viridans*, *Strept. mucosus*, and three strains of *Strept. pyogenes*. *Strept. mucosus* was isolated from the spinal canal in a case of meningitis. The pyogenic

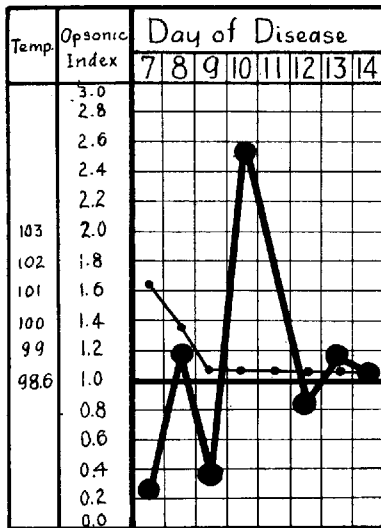


CHART 1.—Streptococco-opsonic index (heavy line) in erysipelas (man, 20 years) first attack.

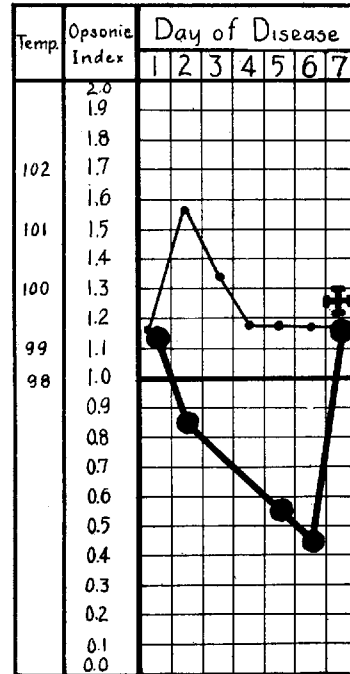


CHART 2.—Streptococco-opsonic index (heavy line) in fatal case of erysipelas (man, 40 years).

streptococci were isolated from the pus of inflammation of the middle ear in the course of an attack of erysipelas, from a bleb on the face of an erysipelas patient, and from the throat of a patient with acute articular rheumatism. Chart 3 shows that while the opsonic index varies as regards *Strept. pyogenes*, it remains within normal limits with respect to the staphylococcus, the pneumococcus and *Strept. viridans*. Chart 4 demonstrates that the opsonic indices to the strains of *Strept. pyogenes* and the *Strept. mucosus* correspond closely.

On heating normal and immune sera at 44° to 49° C. for 20 minutes before the mixtures were prepared for incubation, opsonic indices were obtained such that while they differ in height closely correspond in their course with those obtained in the usual way (Chart 5).

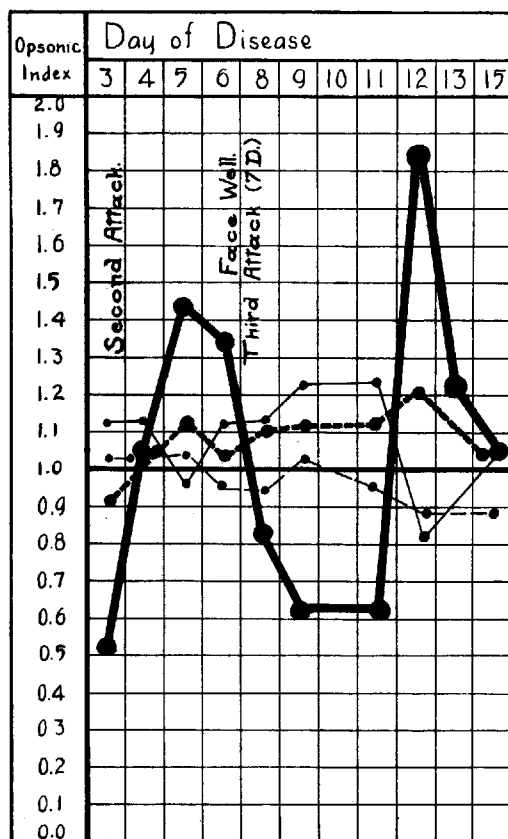


CHART 3.—Comparison of the opsonic index obtained in recurrent facial erysipelas (man, 20 years), with respect to *Strept. pyogenes*, *Staphylococcus*, *Pneumococcus*, and *Strept. viridans*. Solid fine line=opsonic index to *Staphylococcus*. Broken heavy line=opsonic index to *Pneumococcus*. Broken fine line=opsonic index to *Strept. viridans*. Solid heavy line=opsonic index to *Strept. pyogenes*.

The comparative opsonic power of the serum to streptococcus was determined also by diluting normal and immune serum to the point of opsonic extinction as suggested by Simon<sup>1</sup> and practiced by Klien<sup>2</sup> with respect to typhoid bacilli, and myself<sup>3</sup> with diphtheria bacilli. The curves (Chart 5) representing the opsonic power estimated in this

<sup>1</sup> *Jour. Exp. Med.*, 1906, 8, p. 651; 1907, 9, p. 487.

<sup>2</sup> *Johns Hopkins Hosp. Bull.*, 1907, 18, p. 245.

<sup>3</sup> *Jour. Infect. Dis.*, 1905, 5, p. 14.

way correspond fairly closely with the curves of the opsonic indices estimated by the Wright method. In the case of indices of about 1.3 as estimated in the usual way no increase in the opsonic power is evidenced by the dilution method, but when the ordinary indices reach 1.8 or higher the results of the two methods correspond closely.

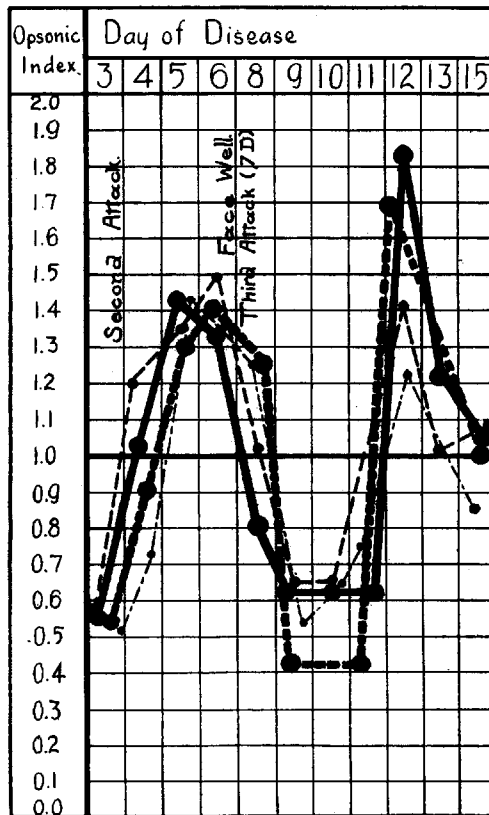


CHART 4.—Comparison of the opsonic index obtained in recurrent facial erysipelas (man, 20 years), with respect to three strains of *Strept. pyogenes* and a *Strept. mucosus*. Broken heavy line=opsonic index to *Strept. mucosus*.

#### CONCLUSIONS.

In erysipelas the opsonic index to *Strept. pyogenes* is generally below normal during the acute stage of the disease. As the symptoms subside and the temperature falls to normal the index rises considerably, returning to normal in from one to three days.

While these changes occur in the opsonic index with respect to *Strept. mucosus* and various strains of *Strept. pyogenes*, the index remains normal to the staphylococcus, the pneumococcus, and *Strept. viridans*.

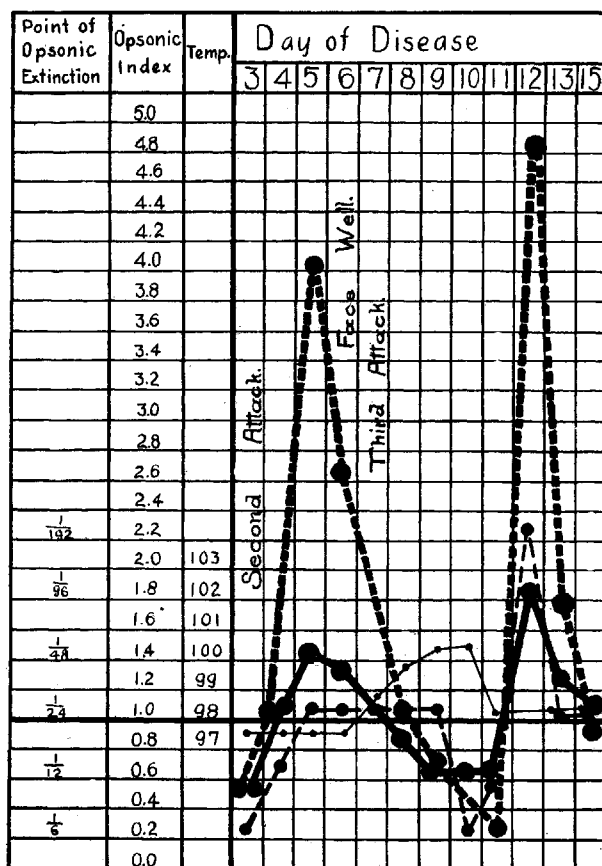


CHART 5.—Comparison of streptococco-opsonic indices in recurrent facial erysipelas (man, 20 years), obtained (a) with sera heated to 44-49° C. for 20 minutes (heavy broken line), (b) with unheated sera (heavy solid line), and (c) by dilution of sera to the point of opsonic extinction (fine broken line). Temperature=fine solid line.

The streptococcal indices obtained by first heating the serum at 44° to 49° C. for 20 minutes are higher but correspond closely in their course to those obtained by using unheated serum.

Curves obtained by estimating the opsonic power on diluting the serum to the point of opsonic extinction correspond fairly closely to those obtained by the Wright method and by the use of heated serum.