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THE DIFFERENTIAL DIAGNOSIS BETWEEN DIPHTHERIA AND OTHER DIPHTHEROID (PSEUDO-MEMBRANOUS) INFLAMMATIONS OF THE UPPER AIR-PASSAGES CAN ONLY BE POSITIVELY ESTABLISHED IN DOUBTFUL CASES, BY THE PRESENCE OF THE KLEBS-LOEFFLER BACILLUS.

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The Differential Diagnosis Between Diphtheria and other Diphtheroid (Pseudo-membranous) Inflammations of the Upper Air Passages can only be Positively Established, in Doubtful Cases, by the Presence of the Klebs-Loefler Bacillus.

One of the Propositions Presented for Discussion before the Orleans Parish Medical Society at the December Meeting.

Medical ideas entertained formerly on the subject of sore throat in general, and especially of the membranous forms, have become so modified in the last few years, and errors of diagnosis, when made in the early stage of these diseases, have been so numerous, that physicians of the greatest experience and repute are rapidly giving up as worthless for differential diagnosis most of the clinical signs and symptoms laid down in our text books as characteristics of these different morbid entities. The fact is that modern investigations have clearly demonstrated that for the early differential diagnosis of the different forms of white anginæ stress must be laid on the bacteriological examination in preference to the clinical appearances.

As for myself, I will say in the language of Dr. Raven, "The more I see of diphtheria, the more fully I recognize the difficulty of speaking positively, in the early stage at least, as to the exact nature of a sore throat."

That the uvula be or not wrapped up in a membrane, that the pillars and pharynx be or not invaded, that the membranous formation be white, grayish or yellowish; that it be slightly adherent or deeply imbedded in the mucous membrane, that the ganglia be engorged or uninvolved, is no longer of very great importance to the modern clinician when he is called upon to pronounce on the contagious or non-contagious nature of the sore throat, or of the rhinitis.

The pseudo-membranous forms are no longer limited as formally to two or three varieties.

Their classification has become much more complex, thanks to modern histological and bacteriological studies.

Every variety of membranous sore throat corresponds to a different pathological microbe, or to a microbic association. The angina is white because the membrane is the product of inflammatory reaction of the parts in consequence of a microbic infection; the objective appearances of the membrane, its disposition, its localization, can not of themselves inform us as to the real cause of the sore throat.

Alongside of herpetic pharyngitis, of follicular tonsillitis, etc., are to be placed the sore throats caused by the Klebs-

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Loefler bacillus (true diphtheria), by the streptococcus (erysipelas, scarlatina, croupous angina, etc.), by the staphylococcus albus or aureus, by Eberth's bacillus (typhoid fever) and probably by other microbic entities actually unrecognized.

A bacteriological investigation is therefore the only certain differential diagnostic means in those numerous forms of membranous formations.

With such views regarding the unreliability of an early diagnosis based solely on the clinical appearances of a pseudo-membranous affection of the upper air passages, you will pardon me if I avoid the *finesses*, not to say the fallacies, of the numerously enumerated text-book appearances, and I limit myself to a classification of these different morbid entities, with an enumeration of the broad differential characters which may allow the modern clinician to prejudge, to some extent, the nature of the affection in anticipation solely of a bacteriological culture.

Pseudo-Membranous Rhinitis.

The nose may be the seat of membranous formations under three different conditions: (1) When invaded secondarily from the throat by the Klebs-Loefler bacillus, or when itself the primary seat of diphtheria; (2) when affected by what has been termed croupous or fibrinous rhinitis; (3) when a fibrinous exudation is produced as a result of a galvano-cautery or chromic acid, etc., application.

Outside of the fact that in this last class of cases there is a history of an operative interference, and that in fibrinous rhinitis the throat is never invaded, all other clinical signs are so uncertain that, in most cases, a bacteriological culture is absolutely necessary for an early differential diagnosis.

Sore throats may be conveniently divided into two classes, viz.: the membranous anginæ, and those which are non-membranous but may be accompanied by a white or pultaceous exudate underlined by an unaffected or by an ulcerated mucous membrane.

CLASS NO. 1.

Pseudo-Membranous Anginæ.

This class can be conveniently subdivided into two groups:

Group No. 1: Primitive Pseudo-Membranous Anginæ.

1. Diphtheritic sore throat.
2. Angina due to the presence of streptococci.
3. Angina due to the presence of staphylococci.
4. Angina due to the presence of pneumococci.
5. Angina due to the presence of other cocci.

} Pseudo-diphtheritic anginæ.

To this group belong, outside of true diphtheria, the inflammations which reproduce so closely the symptomatic tableau of diphtheria that they have been lately classified under the name of false diphtheria. They include such affections known formerly as pseudo-membranous angina, croupous tonsillitis, etc., and are due to the presence of streptococci, of stophylococci, of pneumococci and other cocci. The physical and histological appearances of the false membrane bear such a resemblance to the membranous productions of true diphtheria and the microbic associations are so numerous and the clinical history of this group (diphtheria excepted) is yet so incomplete as to force upon us the necessity of a bacteriological culture in order to differentiate positively these sore throats from the one of true diphtheria.

These are the anginæ so often mistaken for diphtheria. Their causative micro-organisms, their different systemic infection and their low mortality mark the broad lines of demarcation.

The brusque onset of these anginæ, the rapid elevation of temperature, the violence of the sore throat, and the peculiar red and inflamed condition of the throat are the few points to be remembered as worth anything for the clinical differentiation of these forms from true diphtheria.

Group No. 2: Secondary Pseudo-Membranous Anginæ.

1. *Scarlatinous Aginæ.*—The early pseudo-membranous sore throat which accompanies an eruption of scarlet fever must be considered most ordinarily as pseudo-diphtheritic, no matter if it invades the larynx or nasal fossæ. If it precedes the eruption, the diagnosis must be reserved or made bacteriologically. It will generally reveal the presence of the staphylococcus pyogenes.

The insidiousness of the attack, the greater implication of the general health, paler complexion, depression of strength, lower temperature in diphtheria, with an absence of the appearance of the tongue and of the redness of the soft palate peculiar to scarlet fever, will furnish a few clinical data for the differential diagnosis. Let us, however, remember that mild cases of diphtheria will be met with where the general health is almost unaffected, and that septic forms of scarlet fever will produce very grave symptoms.

As to the pseudo-membranous formations which appear in the advanced stage of an attack of scarlatina, they must be considered very generally as being truly diphtheritic, for in most such cases a culture develops the characteristic Klebs-Lœfler bacillus.

2. *Syphilitic Anginæ.*—The pseudo-membranous anginæ of syphilis may at times be difficult to distinguish from true diphtheria. For the diagnosis of the chancre, when covered by a fibrinous exudate, the marked induration of the tonsil, the unilateral location, and the closer adherence of the membrane, which unlike other pseudo-membranous productions has no tendency to spread, the characteristic bubo and absence of fever are clinical signs of great value.

The mistake, however, has oftener been made in the pseudo-membranous anginæ of secondary syphilis, which resemble more closely diphtheria.

The localization of the pseudo-membrane on the tonsils, on the pillars, uvula, and even on the posterior pharyngeal wall, the color and the adherence are somewhat alike. In some cases of secondary syphilitic laryngitis the vocal and respiratory disturbances might impress one with the idea of a concomitant croup. Still the usual absence of fever and the preservation of the general health are in marked contrast with the extent of the pseudo-membranes; the absence of albuminuria, the presence of a specific roseola or of mucous patches, the study of the anamnestics, with the use of the laryngoscope, will allow a careful clinician to formulate a positive diagnosis.

3. *Traumatic Pseudo-Membranous Anginæ.*—Pseudo-membranous formations will at times develop on the section of a tonsil or in the nose as a result of cauterization with the galvano-cautery or with certain acids, as chromic acid, etc. The knowledge of this fact will suffice to prevent any error of diagnosis.

CLASS NO. 2.

Non-Membranous, Pultaceous and Ulcerated Anginæ.

These forms of sore throat, while less liable to be mistaken for diphtheria, will still at times present difficulties of early diagnosis, especially in cases of confluent herpes of the throat or in acute lacunar tonsillitis.

1. *Herpes of the Pharynx, Herpetic Angina or Confluent Herpes of the Throat.*—The phlyctenular or vesicular appearance of this sore throat at its onset will prevent any mistake; but when the vesicles have disappeared and are replaced by minute ulcerations, which have coalesced and are covered by a white and adherent exudate, the differentiation of herpes from diphtheria may be difficult.

The suddenness of the attack, the violent initial chill, intense cephalalgia, gastric disturbance, marked elevation of temperature, accompanied often by great general malaise and a

concomitant labial herpes will justify the probable diagnosis of herpetic angina, especially if the patch is polycyclical and underlined by an ulcerated surface.

Albuminuria and ganglionic enlargement are very uncommon symptoms in this disease, but may also be absent in light cases of diphtheria. Herpes of the throat is rarely met with in children.

2. *Lacunar, Follicular or Cryptic Tonsillitis.*—The limitation of the exudation to the tonsils, the short duration of the attack, the severity or the mildness of the accompanying febrile excitement, the infectious or non-infectious character of the disease, the presence or the absence of albuminuria or of adenitis, should be of less weight in making a differential diagnosis than the two following points, which in my experience are most important.

The white spots or membraniform patches of lacunar tonsillitis occupy a direct relation to the crypts, and are consequently located on the more central portion of the convexity of the tonsil. In diphtheria limited to the tonsil while the pseudo-membrane may be seen on that portion of the tonsil, it will develop also on the lateral or marginal portion of this organ. Pressure or a bent probe introduced in the lacunæ will force out the cheesy contents of the crypts. In cases of struggling children I have found the advice of Jacobi, who, in doubtful cases of follicular tonsillitis, syringes the throat with warm salt water, and thus cleanses it of much deceptive material, a most serviceable diagnostic sign. If this cheesy exudate is not thoroughly removed under a forced stream of water, and there remain spots of membraniform appearance, adherent to the mouths of the crypts, the diagnosis should be reserved and a culture made at once. I must confess, however, to have met several instances which were to all clinical appearances typical cases of follicular tonsillitis, and still turned out to be cases of true diphtheria, one of which ended fatally in diphtheritic laryngo-tracheitis; two others, in which a Klebs-Loefler culture was made, ended favorably without having ever developed a true pseudo-membranous formation.

3. *Acute Tonsillitis.*—In such cases thin, translucent, milky patches will be met with covering a red mucous membrane and a swollen organ; also at times the soft palate, the uvula, but more rarely the pharynx. This epithelial exudate, resembling the saburrhal condition of high and prolonged fevers, is easily detached and easily dissolved in water, and can not, except through gross carelessness, be mistaken for a pseudo-membrane.

4. *Pultaceous Angina.*—In this form, which is encountered in low or debilitated states of the system, as in the cachexiæ or in the course of typhoid, also of scarlet fever, the exudate is friable and soft, easely brushed off without injury or bleeding of the mucous membrane, and can not be mistaken.

5. *Confluent Muguet.*—When this cryptogamic disease invades the tonsil or throat, which is rather rare, it will be differentiated easily from diphtheria by its characteristic appearance, which is grumous and resembles dots of curdled milk, which are easily swabbed off. In case of any doubt, the microscope will readily demonstrate the presence of the mycelium and spores of the oidium albicans.

6. *Ulcero-membranous Angina.*—The fact that it is an extension of an ulcero-membranous stomatitis, generally unilateral, characterized by a necrobiotic process, an abundant salivation, devoid of constitutional symptoms and unaccompanied by fever or glandular swelling will readily distinguish this disease from diphtheria.

7. *Gangrenous Angina or Sore Throat.*—This angina is ordinarily secondary to a general disease or to an eruptive fever; at times it will be met with as an idiopathic affection, characterized from the beginning by the blackish color, the fetid odor, the sloughing tendency of gangrene, leaving behind it, upon the elimination of the eschar, etc., sometimes very deep ulceration. It is very seldom accompanied by enlargement of the lymphatic glands.

8. *Aphthous Angina.*

9. *Pharyngo-Mycosis.*—These last two affections are mentioned *pro forma*, as confusion with diphtheria is scarcely possible. The coexistence of aphthæ in the mouth or on the tongue, with their peculiar small transparent vesicles, generally isolated, ending in a shallow, round ulceration covered with a thin film of dirty yellow slough, will clear all doubt as to the nature of the angina, which is, anyhow, a very rare affection of the throat. As to the pharyngo-mycosis the deposit is elevated on the surface of the tonsil, pharynx or base of tongue, composed of white or yellowish, somewhat indurated projections hard to remove, and unaccompanied by local or general inflammatory reaction. If doubt was possible as to the nature of the affection, the microscope would always reveal the presence of the characteristic leptothrix buccalis.

In conclusion I will say that if there are a great many forms of sore throat where an early diagnosis, based on the clinical appearances, will acquire a high degree of probability, there are also many cases in which a culture affords the only means of avoiding very fatal mistakes, especially if we re-

member that bacteriology has confirmed the existence of cases, rare it is true, of "diphtheria sine diphthera," that is of sore throat without pseudo-membranous formation, stimulating simple angina, but in which a culture develops numerous colonies of virulent Klebs-Loefler bacilli. * * * *

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