

AN
INAUGURAL DISSERTATION

ON

Tetanus.

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BY

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This writing is respectfully inscribed to
Paul F. Eve, Professor of Surgery, in the
Nashville Medical College, by the Author,
as an humble token of the great
respect and admiration he has of those
qualities which have placed him in
the front rank of his profession, and
of the love he bears him for the unwa-
ving kindness, that has fixed him
first in the affections of his pupils.

Tetanus.

Tetanus is a disease of the nervous system, characterized by a severe and rigid contraction of a part or the whole of the voluntary muscles.

It is divided, first, into traumatic and Idiopathic. Secondly, into Trismus, Opisthotonos, Emprosthotonos, Pleurosthotonos and Tetanus proper.

As to the first division, Erichsen says that the Idiopathic variety is seldom met with; hence he regards this division as useless.

We shall begin our description of this disease by examining the phenomena common to every form and variety of the disease, including, in this general description, an account of Trismus, as this is con-

-sidered, by the best writers, as a part or feature of each variety.

The approach of Tetanus is sometimes unannounced, but generally the patient feels an indescribable sensation of fear and a sense of impending evil. The disease is recognized when the patient feels what he calls a 'cramping in the back of the neck', together with a dry sore throat and difficulty of swallowing. Very soon we observe the closure of the jaws, which sometimes come together suddenly and with an audible snap - at other times they approach by degrees and remain so fixed that it is impossible to separate them; this is never attempted, for the reason that, if separated, neither

food nor drink can be swallowed, on account of the spasm of the muscles of the Pharynx; or if the patient does swallow any liquid or solid, it is accomplished with so much pain and agony that, afterwards, the sight of any thing to swallow causes as much pain as the act of deglutition itself.

Sometimes the teeth are slightly separated and a dark-colored, foul and thickened saliva escapes. These are the most prominent symptoms of trismus or locked jaw, which symptoms are recognizable in all the other forms of Tetanus, with the addition, in each, of a more extended surface.

When we have any other form of the disease, we may first see a

clearly defined case of Trismus, then we have a sharp, agonizing pain in the region of the Diaphragm; at this time the body and extremities become contracted in various ways: the face is flushed until purple: the muscles of the face are contracted in such a manner as to produce a grim, blood-chilling smile - The 'Rictus Sardonius': the contraction of the muscles of the Thorax gradually increases until there is a degree of dyspnoea painful to behold, by the continuance of which, the death of the patient is brought about.

It is wonderful what a degree of self-possession, cheerfulness and clearness of mind there is in these cases. The case would lose a part of its

horror, if the patient were saving in de-
lirium or would express, by actions, the
pain he feels: but it is extremely pain-
ful to see the doomed man calm, ra-
tional and even cheerful, while his
grief-stricken family are silently
weeping around, knowing him to be
in the most awful agony.

The functions of the different
organs are variously affected - The
circulation is partially clogged by
the muscular contraction, according
to several prominent authors -
The heat of the Skin is generally in-
creased; this is caused, say Sir O.
Brodie and others, by the diseased
state of the Spine, which is proved
by experiments upon inferior animals,
The perspiration is copious and

continued and has a peculiar, pungent odor. The Urine is unchanged in quantity, though often high-colored. There seems to be a remarkable degree of inactivity, in the intestines, which is present in almost every case - when an operation is obtained, it is dark-colored, unnatural and very offensive.

Generally, in from twenty four to thirty six hours, in acute cases, the disease prevents the patient from swallowing at all.

"In the progress of the disease", says Robley Dunglison, "we often see an apparent emaciation, the bones of the muscles become distinctly visible through the skin, and their rigidity increases." As death approaches, a dark, fetid fluid, composed of

blood, mucus and saliva, exudes from the mouth; the face becomes more and more distorted - dry-cold sweat stands, in heavy bead-like drops, over the whole body - the pain of the patient is increased by the slightest exertion, by the increase of the spasm - the difficulty of breathing, already terrible, is rendered insupportable - the pulse dies away and the patient is dead.

Writers are not agreed as to the duration of the disease. Hippocrates says, in one place, four days - in another, he says the Third, Fifth, Seventh or Fourteenth may be the fatal day. Mous. Andral considers four or five days to be the average duration - Jourdain-Pescay says that it is a rare thing to see Tetanus terminate so late

as the seventh day.

It is generally the case, as before stated, that the patient dies in the way of Asphyxia. This is the opinion of a majority of authors; but Parry and Howship think that "the heart, superceded by the long continued agony and perhaps involved in the prevalent affection of the muscular parts, has at least an equal share in the production of the fatal result." Robley Dunglison leans to this opinion. "But in whatever manner death is brought about," says Artaeus, "it is an event happy to the tortured patient and gladly hailed by his friends. Far less calamitous is it than his previous sufferings, in the estimation of the bystander, even if he be the victim's own son or father."

The variety of this disease most frequently met with is *Opietholomus*, the characteristic feature of which is the arching backwards of the neck or the whole body. The muscles of the back of the neck are so rigidly contracted that the head is drawn down upon the nucha and the larynx thrown forwards. In some cases this is the sole feature of the disease; but more frequently the muscles of the spine are affected by the spasm, and the whole body forms an arch, the extremities of which are the vertex and Sacrum. The inferior extremities are extended. The arms are usually extended, but sometimes are bent across the breast and the hands are clenched together, or when, as is usual,

The fingers are unaffected by the spasm.
The hands are folded as in prayer.

"The abdominal parietes are so on the stretch," says Arcturus, "that they are hard as a board and convex when percussed."

The varieties, *Emprostotonos*,
- the opposite to the variety last mentioned - and *Pleurostotonos*, the distinguishing feature of which is the arching to one side of the head, neck and body, are seldom met with and little spoken of by writers, and deserve no particular notice here.

The last variety we shall mention is the *True Tetanus*, in which the whole body is rigidly extended; it consists of a spastic action

which attacks the flexor and extensor muscles with equal force. - or, in other words, there is balance between the forces of flexion and extension - this variety is easily recognized, having the symptoms described above as common, only differing from the other varieties in the spastic action affecting equally the flexors and extensors.

The lower orders of Creation, as well as man are subject to this disease.

It has been seen, by some writers of distinction, in Parrots, Horses and Lambs.

We shall now, with as much brevity, as is possible, consider the causes that bring about the morbid phenomena we have attempted to describe. At the head of the list stands mechanical

injuries. We cannot specify what kind of wound will, in most cases bring on an attack. As is distinctly stated by several distinguished writers, an attack may follow from any wound, be it an amputation or the scratch of a pin—

"Every description of wounds, says Symonds, no matter how inflicted, or in what part, or in what stage, may be the occasion of Tetanic symptoms, which form the species denominated traumatic."

The next on the list of causes we find 'Exposure to Cold and damp'. Symonds says, "There are very few cases of True idiopathic Tetanus, that can be referred to any other exciting cause".

Worms in the intestinal canal, it is contended, are the cause of very many attacks of Tetanus. — There are many

other causes enumerated by Dr. Symonds, who has collected the opinions of all the most prominent authors, of this and the earlier ages, upon this subject, among which he gives as occasional causes Terror; Mental anguish; the excitement following Abortion; undue cessation of Perspiration; The accumulation of foreign or indigestible substances in the intestines; suppression of the Lochia; Alcoholic intoxication; Acute diseases, as variola, Typhus and Inflammation of the Stomach -

The cause of Trismus Ascendens, or variety of Tetanus met with in very young infants, is said to be irritation of the intestinal canal, caused by the detention of Meconium and by the presence of worms and immaturation

secretions. It is maintained by Watson, of Nashville, that neglecting to properly attend to the umbilicus is the cause of almost every case, and that, if the cord is draped as it should be and cleanliness preserved in all dressings &c, there will be almost certain immunity secured.

Males, it is said, are more frequently and severely attacked than females. Persons exposed to very warm situations acquire a predisposition to Tetanus -; the same may be said of humid places, bad food, close rooms, filthiness and neglect of the bowels.

We are now led to speak of the Prognosis of this disease which is arrived at after considering the cause and type of the attack. If the attack proceed from mechanical

injuries or, in other words, if we have the traumatic species, we may generally expect a fatal result. If we have a case of idiopathic Tetanus there is a greater probability of recovery. In the division acute and Chronic, we may state upon the authority of Dr. Dickson, of Charleston, that the patient seldom if ever recovers from an attack of the former, while it is not an unusual thing for him to survive an attack of the latter.

In considering the Diagnosis, we find Tetanus resembling, in many points, Coma - It resembles strikingly Hydrophobia - Again it is often very much like Hysteria. There are affections proceeding from local inflammation often mistaken for Tetanus. The effect of certain poisons is similar

to Tetanus. Thus we find *Arus boruica*,
Strychnine, *Hyoscyamus*, *Corrosive Subli-*
mule, *Belladonna*, *Stramonium* and
Cocculus Indicus presenting to the transient
observer, a train of symptoms that leads
him to declare that the case before him
is Tetanus. In order to diagnosticate
properly and correctly, in each of
these cases, we must study the history
of the case - regarding each symptom
by itself, then all the symptoms together.

The period of accession depends
on the cause - If mechanical injuries
be the cause, the attack generally en-
sues before the seventh day -
When originating from any other cause,
it hardly ever delays its appearance
more than thirty six hours.

In the post mortem examination of

These cases, there is little of interest to be met with. In a case reported by Symonds, examined by Bonetus - it is said, "The ventricles of the brain were filled with a certain viscid and glutinous matter, a little foetid and resembling the yallow of an egg." "This," says Bonetus, "produced ~~compression~~ compression, the most of symptoms of which were seen in the neighboring parts." "The Meningea media, on either side, was turgid bilioso sanguine." In the recorded autopsy of each case there appears to be some derangement in the cerebral organs.

The Spinal cord presents, in almost every case, an abnormal appearance. The Pharynx and Oesophagus are contracted and contracted.

The Stomach and intestines appear to

have been subjected to great irritation, presenting inflamed and maturing surfaces internally.

The 'treatment' of this disease is divided into local and constitutional. The intention of the Physician, in the application of local remedies, is to do away with the irritation that is the cause of the tetanic condition. But in many cases the removal of the cause does not affect the progress of the disease: for when the 'tetanic excitement' is once established it has a tendency to continue, notwithstanding the removal of the cause. But we should remove the cause in every case, so as to give full play to the constitutional remedies given. In the Grammatic species we

should always free the wound of every foreign or irritating substance. Then if there is a nerve injured it should be divided between the wound and the cord. The wound, if not doing well, should be poulticed with emollient substances. Erichsen says that it would be advisable, when no particular nerve is injured, to incise the wound by a Λ shaped incision above the wound, extended to the bone. Then some solution of Atropine may be applied to allay the irritation.

As to the constitutional remedies, we will consider them singly and give the opinions of the writers on each.

We will first look at Blood-letting. The advantages to be gained by the use of this remedy are not apparent.

When we consider that Death is the consequence of the exhaustion and debility of the patient, we would be guilty of great folly if we were to take away the very principles that sustain him. It is true that, when fever supervens and the wound is greatly inflamed, we might, with propriety, resort to bleeding from the arm and cupping along the spine. But we should be careful never to bend to syncope, as the patient, in all probability, would never recover from it.

Mercury. This may be given in cases when bleeding is admissible, in doses of three grains every 2. or 3. hours.

Tartar Emetic may be given in nauseating doses, in the same cases.

Purgatives are always indicated unless

When the Alimentary Canal is diseased or the patient is affected by Dysentery, Ulcers &c. But when this is not the case, we should give, when the attack first makes its appearance, an active cathartic, as the bowels are, usually, obstinately constipated and because there may be foreign matters in the bowels that may be the exciting cause-

Tobacco is said to be one of our most useful remedies in Tetanus. It is administered per Annum, four ounces at a time, of the strength of ℥i. to ℞j. water, repeated two or three times daily.

Colic may be applied in Chronic Tetanus, but is very dangerous in the acute form-

Tonics are recommended to counteract debility; and we find the use of the

Muriated Tincture of Iron, Iodine and Wine, in large quantities, to be highly advantageous.

Opium - The use of this article is advocated by some - deprecated by others. Dr. Witt recommends it in cases where there is a painful wound and great weakness - He prefers administering it by blistering and sprinkling a grain of Acetate of Morphia upon the denuded surface. If given internally it should be in large doses & in the liquid form. The resin of Cannabis Indica has been recommended in doses of ʒ grains every half hour.

The Cyanuret of Potassa has been recommended by Dr. Ew. given in large doses.

This operates beneficently, says Dr. Ew.

Several cases of this disease have been

cured by the use of large quantities of alcoholic liquors.

We see recommended, in different places all, or nearly all of the Antispasmodics, Camphor, Musk, Ether, Chloroform, Castor, The warm bath, Assafoetida and also Stramonium, Belladonna and Digitalis

If a case were presented to us, if of the traumatic species, we should follow the plan of treatment recommended by Professor Erv. He advises insulation of the wound by the Λ shaped incision of Liston. He, moreover, advises the more complete insulation of the wound by the application of the ligature around the limb, above the wound, when the wound is on either extremity. This last recommendation, we do not think, is to be found in the works on Surgery. As it seems so

reasonable, and as it is recommended by Dr. Ew, we should certainly adopt it, if called to treat this variety of Tetanus. In the idiopathic form we should first unload the bowels of the patient by giving Croton oil, Turpentine acuminata &c.

Mitigating the symptoms of inflammatory action with antiphlogistic remedies. We should found our hopes of the recovery of the patient, principally upon the use of Chloroform. Next to this agent we should place greatest reliance upon tobacco.

Nourishing diet is of great importance to the patient. Wine, beef tea &c. should be given for Anus if it cannot be given through the mouth. Indeed the majority of medicines, food &c have to be administered through the skin.

or per annum. The patient must be kept in mental & physical repose.

If after all we have done to cure the patient we fail, then our object should be to alleviate the awful sufferings that afflict him— And it is well if we can retire from his bedside cheered, though our hearts be heavy with sadness, with the consciousness of having done our duty— And uttering a prayer for his soul's safety and leaving it to the mercy of a Great God, we can consign his body to the silent grave without a feeling of regret.