On
Inflammation
as it
affects some of the Principal
Tissues and Organs,
and the
Causes of its Occurrence.

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Un Inflammation as it affects some of the principal Tissues and Organs, and the Causes of its occurrence.

To constitute true inflammation, there must be exudation of healthy liquid sanguinis from the blood vessels. The symptoms of its occurrence are pain, heat, redness, swelling, and more or less constitutional disturbance.

When the inflammatory process is excited in the web of a frog's foot, by the application of an irritant, the first changes observed in the part, if placed under a microscope, are sudden contraction in the diameter of the capillaries, and great increase of rapidity in the current of the blood. By degrees, however, the vessels enlarge, the circulation becomes gradually slower, and the corpuscles which formerly
passed through one by one, now begin to pass abreast. Some appear to go back-
wards, so that an oscillating motion is produced. By and bye, the circulation
ceases altogether, the corpuscles seem matted together, and the vessels appear
to be filled with a homogeneous crimson coloured mass. If the vessel does not
give way, causing extravasation, there is an excudation of liquor sanguinosis
through the coats.
The contraction of the calibre of a vessel depends on a vital contraction
of its coats, on a vital contraction of surrounding structures, or on both these
causes; and the increased rapidity of the blood in the vessel affected is ex-
plained on physical grounds. For, when a fluid is driven forwards with
a certain force, and the tube through which it passes is narrowed, the fluid
must necessarily go with greater rap-
idity. i.e. it cannot pass by other channels.
The relaxation or dilatation of the
capillaries is probably due to paralysis of these vessels, and the slowing of the current can be explained on the same physical ground as its increased velocity when the vessels are contracted. The oscillating motion of the blood has not been observed in man. It has been seen only in small animals held fast under the microscope, and probably is due in them to a weakened action of the heart.

Some have considered the stoppage of the blood to be owing to a mechanical obstruction of the capillaries, but it is generally believed that this phenomenon cannot be accounted for except by supposing a vital attraction to exist between the blood and the surrounding textures.

Extravasation is caused by the rupture of the vessels, and the pouring out of their contents into the surrounding tissues, but this often happens when there is no inflammation, it can
scarcely be regarded as an evidence
of the existence of that state.
The liquor panguinis after being
exuded from the vessels coagulates and
probably passes into one of several
vital transformations, thus
It may develop itself and form new
structures, or repair the loss of parts, con-
stituting the termination by adhesion.
It may be converted into pus cells,
constituting suppuration.
It may become changed into
granule cells or exudation corpuscles,
forming inflammatory softening.
The exudation may show no tendency
to development, but may lose all vitality
and undergo rapid putrefaction, con-
stituting the worst termination of
inflammation, mortification or
moist gangrene.
Sometimes it does not pass through
any vital transformation, but grad-
ually by its continual prepare causes
disintegration and loss of substance.
in the tissue where the inflammation has occurred, and this constitutes ulceration.

Inflammation of Serous Membranes

When liquor sanguinis is poured out on the surface of a serous membrane, it generally takes the adhesive form, the fibrine attaching itself to the membrane, while the serum occupies the shrunken cavity. When death takes place at the commencement of the disease, the exudation is found to present a transparent and gelatinous appearance, and on microscopic examination, a number of minute filaments mingled with corpuscles are observed. The filaments are similar to those seen in the Buffy coat of the blood, and are supposed to be produced by the precipitation of molecules which become arranged in a linear
manner so as to form delicate threads.

In less acute cases, when the exudation has not been so rapid, and death has occurred at a later period, the lymph on examination is found to form a complete lining on the inflamed surface, which lining is generally smooth on the serous membrane of the brain, but often honey-combed and rough on the pericardium. In this structure, cells may sometimes be seen becoming developed into fibres, and mixed with these cells are filaments like those of cellular tissue.

When the inflammation has become sub-acute, the coagulated lymph gets more consistent, and may glue together opposing serous surfaces as, for example, those of the pleurae pulmonaryis and costalis, or may unite them by a series of bands which become shorter and stronger as the development proceeds.
examination, these bands present the ordinary appearances of fibrous tissue.

If the disease has been chronic, the serous membrane is apt to continue for a long time thickened and indurated, and indeed in some cases it presents a cartilaginous or bony appearance.

Though generally speaking the tendency of the exudation in serous membranes is to take the adhesive form, yet if the attack has been very violent, or air has been admitted to the part affected, purulent matter may be formed in the cavity.

The pain accompanying serous inflammation is commonly sharp and lancinating, its exceedingly acute character being sometimes sufficient to distinguish inflammation of this tissue from that of any other in the neighbourhood. It is always aggravated by motion,
or pressure.

Ulceration originating in a serous membrane is very uncommon, though this tissue is often perforated by an ulcer originating in the membrane or texture to which it is attached.

Necrosis seldom occurs, except by communication from neighbouring parts.

Among the most common causes of inflammation of the serous membranes are exposure to cold, especially when the body is warm and perspiring; mechanical injuries; and such diseases as Phthisis, Rheumatism and Bright's disease of the kidney. The violence of the exciting cause and the state of the system generally may determine whether the inflammation shall be more or less acute or chronic. Cold for instance may bring on Pneumonia of any degree of intensity.
Inflammation of Mucous Membranes.

This tissue, from its delicate structure and constant exposure to irritating causes is exceedingly liable to inflammation. When an exudation takes place, it sometimes as in group forms a fibrous structure, but generally it becomes converted into a creamy thick opaque and straw-coloured fluid, which has been named pus, and which under the microscope is seen to consist of numerous yellowish corpuscles diffused through a clear fluid. These corpuscles are perfectly spherical in form, and have a distinct envelope enclosing a mass of granular substance, and a varying number of nuclei which bear the appearance of two or three granules united together. Sometimes a wall is seen surrounding the pus cells themselves which then appear like nuclei inside this wall. These cells have no power of development,
but break down into granules and are removed by absorption.

Generally speaking, little pain is felt when mucous membranes are inflamed, and in this as in the fact that there is great increase of redness, as well as a tendency to ulceration, the inflammations of this tissue present a marked contrast to those of serous membranes. It is fortunate that in mucous inflammation, the exudation is not very apt to take the adhesive form, for if it did so, almost every attack would prove fatal by closing up the inlets or outlets of the body.

In croup as already stated, false membrane is often developed contrary to the usual course of inflammatory exudations on mucous surfaces. The general exciting cause of croup— which is almost peculiarly a disease of early life, apt to recur in the same individual in a milder form, and prevalent in
particular families—is exposure to a combination of cold and moisture. The purulent matter formed in Bronchitis is generally expectorated, sometimes however when formed in large quantity, the patient cannot cough it up from weakness, and death by suffocation may occur. When Bronchitis has recurred frequently, more particularly if it is complicated with Hooping-cough and Asthma, it may cause Emphysema and this like every other disease which impairs the circulation through the lungs may produce enlargement of the right side of the heart. The general exciting cause of Bronchitis is exposure to cold and wet. It may be complicated with a great number of other diseases.

The mucous membrane of the eye is subject to an inflammation called Purulent Ophthalmia. The vessels become congested, an exudation...
takes place and becomes transformed into purulent matter. The pain of
this inflammation is severe and burning. The textures adjoining
the conjunctiva are frequently af-
fected, and ulceration of the cornea
with evacuation of the aqueous humour
is a common consequence. The causes
producing this inflammation are
 certain conditions of the atmosphere,
mechanical irritation from particles
of sand &c, and it may also be excited
by a direct application to a healthy
eye of matter from a diseased one.
That forms of Purulent Ophthalmia
which occurs in connexion with Gon-
orrhoea may according to Mr. Lawrence
be produced by metastasis from the
urethra, in the same way as distant
parts are affected in gout and
rheumatism.

The most important inflammation
of the mucous membrane is Dysentery,
a disease affecting the large intestine
and tending to ulceration and gangrene. This disease is very fatal and common in warm climates, and is called by Sir James McGeiger the scourge of armies and the 'most fatal of all' their diseases. It sometimes takes the chronic form which is generally fatal in the end. The long continued influence of heat predisposes to this disease, but the most common of the exciting causes is cold especially when combined with moisture. Its occurrence has also been ascribed to the use of bad food, polluted water, to the agency of malaria, and to contagion.

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Inflammation of the Heart, and Bloodvessels.

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Inflammation of the substance of the heart seldom occurs, and when it does, it is almost always complicated with
Inflammation of the internal or external lining membrane of that organ. The whole substance of the heart has on one or two occasions been found softened and infiltrated with pus, but as a general rule the inflammation is only partial, and its occurrence is shown on dissection by the presence of minute abscesses or ulcers of various sizes. Its causes are not well known, but it has been alleged that persons in whom the affection occurs have generally been subject to rheumatism.

The arteries are very little liable to inflammation and when an exudation does take place, it seldom becomes converted into pus. That a chronic inflammation of their coats has existed is sometimes only made known by the coming on of such diseases as Apoplexy and Palsy. Mechanical violence such as in the ligation of arteries, cold &c. have been said to produce Arteritis, but there can be no doubt that its causes are often most obscure.
Inflammation of the Veins is of more frequent occurrence, and of greater interest than that of the Arteries. It sometimes tends to rapid thickening and effusion which may take the form of plastic lymph or of pus. When the exudation takes the adhesive form, though there is local pain, there is far less danger than when the inflammation results in suppuration, for then it proves a most fatal disorder. The pus circulates in the blood, and may cause deposition of purulent matter in the joints, in the lungs, in the kidneys, or in other parts, while no local pain need be felt at all. Inflammation of the Veins may arise spontaneously, or may be caused by mechanical violence, by the use of a dirty lancet, by certain surgical operations, and by a number of other ways.
Inflammation of the Brain.

When an inflammatory exudation is thrown out on the surface of the brain, it does not form filaments as in a serous membrane, but consists of a number of small granules which may be seen coating the vessels in layers of a thickness and extent corresponding to the amount of the effusion. On examining a recent exudation, nothing but masses of these granules will be seen, like a later period round transparent globules mingling with the granules may be observed. These are the nuclei of cells of an oblong or spherical shape which are soon after observed in various stages of development, and have been called granule cells or exudation corpuscles to distinguish them from the plastic and pus cells. When fully formed these corpuscles may be seen to be distended with granules which obscure the nuclei, and at length burst...
the cell wall. The development and breaking down of the corpuscles go on simultaneously in the exudation, and cause it to be converted into a soft, pulpy, and diffusent mass. In consequence of this, changes take place in the texture of the part; most commonly there is softening.

When the softening of the brain is accompanied by a red colour of the part affected, it is termed Ramollissement Rouge; when there is a diffuse purulent infiltration, it is called Ramollissement Jaune. These softenings are frequently accompanied by the extravasation of blood which may either have been the cause or the effect of the disorganization. Purulent matter is also often found in circumscribed abscesses surrounded by healthy brain substance. In chronic inflammation there is often hardening instead of softening. That these inducations are occasioned by chronic inflammation,
and not by any cause unconnected with the inflammatory process is the more likely, because they very frequently are found to exist round a phlebitic clot, the blood extravasated having acted as the exciting cause.

Softening of the brain without change of colour constituting what is called simple softening, though often dependent on mere perversion of nutrition, is also sometimes a result of inflammation of a chronic type.

Inflammation of the brain may be produced by injuries — sometimes very slight — inflicted on the head, by cold, by the suppression of ac-customed discharges, by foreign materials such as pus circulating in the blood, by disease of the bones of the cranium, and by other causes. The scrophulous diathesis though not an exciting is a predisposing cause of this as of other kinds of inflammation.
Inflammation of the Lungs.

When inflammation attacks the lungs, an effusion takes place; the tendency of which is to the development of the exudation cells described when speaking of inflammation of the brain.

Soon after the exudation has taken place, the inflamed lung seems gorged with bloody serum, is of a deep red colour externally, and does not crepitate like a healthy lung, but appears to have less air than fluid in it. It will float in water, but it is considerably heavier than when in the healthy state and can be torn with much greater ease. This state of the organ is called engorgement.

When the disease has gone on for a longer period, the lung loses its spongy character, it does not crepitate on pressure, but becomes solid and will no longer float in water. On cutting into it, the cut surface bears a
close resemblance to liver, and on this account this condition has been called hepatisation by most pathologists. The texture of the lung is softened, and so much (more easily broken down) that Andral has denominated this stage of the disease Ramollissement Rouge.

When the inflammation has made still further progress, the lung loses its dark red colour and presents a greyish appearance. It is softer than in the second stage, and is abundantly filled with pus which rarely takes the form of circumscribed abscess, but spreads into the substance of the lung and renders it spongy. When a section of the diseased organ is made with a knife, or even when it is handled with a moderate degree of force, pus oozes out freely. The more infiltrated the lung is with pus, the more easily broken down it becomes, and it is sometimes so softened that the pressure of the finger will form a
cavity which instantly fills with
purulent matter. This supplicative
stage has been named by Lennec:
grey hepatization, and by Andrall:
ramollissement gris.

The inflamed lung sometimes
becomes gangrenous, but this is
a very rare consequence of ordinary
Pneumonia. True abscess though an
uncommon result of inflammation
of the lungs does sometimes occur in
children.

Inflammation may attack either
or both lungs, but never both equally. All
pathologists agree that inflammation
of the left lung only is much more
frequent than double Pneumonia,
and that inflammation of the right
lung alone is nearly twice as common
as that of the left. The lower lobes are
far more liable to be affected than the
upper, the inflammation generally
commencing below and spreading upward.

There are however instances where the
disease first attacks the upper lobes and proceeds downwards. Pneumonia may be general, or partial, that is, it may involve the whole organ, or what is more common only a part of it. Inflammation of the parenchyma or spongy tissue is almost always complicated with some degree of Bronchitis or Pleurisy. It is most commonly excited by exposure to cold and wet, but sometimes no cause can be discovered.

It has never been satisfactorily explained why vicissitudes of weather produce inflammation of one organ in one person, and quite a different organ in another.

Frequently, Pneumonia occurs in ridiculously superening on Bronchitis on Phthisis, on Heart disease, on Measles, on Scarlet fever or on other affections. Children under five, and men advanced in life are most liable to its attacks. In people of middle age, it is more frequently
complicated with pleurisy. Some individuals are particularly liable to pneumonia, and in them it is very apt to recur frequently. In children the inflammation often attacks both lungs, and occupies distinct small spots which are surrounded by healthy tissue.

Inflammation of the Liver.

When death occurs in the early stages of this disease, the parenchyma of the organ is generally found to be enlarged and more or less softened.

In more advanced cases, circumscribed abscesses of varying form and size may on post mortem examination be discovered occupying more commonly the right than the left lobe. Sometimes they are surrounded by a smooth membranous sac, and are then said to be encysted. If an encysted abscess
is also deep seated, it may continue for a long time without materially alter-
ing in size, or seriously injuring the health of the individual in whom it occurs. The safest manner in which the pus can be discharged is by the ulcerative process throwing open the efferent ducts leading into the duode-
um, the nest by the liver adhering to the parietes of the abdomen and the purulent matter being evacuated externally with or without the aid of the knife. Sometimes the liver ad-
heses to the stomach or intestines, and the contents of the abscess are discharged by vomiting or by stool; occasionally it becomes glued to the diaphragm and the pus bursts into the pleural cavity, unless, as more frequently happens, the opposite surfaces of that membrane have be-
come united. The opening of the abs-
cess into the lungs is not necessarily fatal, as it is quite possible that the
pus may be discharged by the bronchial tubes. Sometimes no adhesive inflammation is set up, and the matter escapes into the abdominal cavity, causing rapidly fatal peritonitis.

Inflammation of the liver may be acute or chronic. The chronic variety may be a result of the acute, or there may be chronic inflammation which has not been preceded by the acute, the exciting cause not being sufficient to produce the latter form of the disease.

Gangrene of the liver as a result of inflammation is very rare, though it does undoubtedly sometimes occur.

Owing to the increased function of the liver in warm climates, Hepatitis both acute and chronic is much more common than in colder latitudes. It is frequently excited by direct injury such as falls, blows, or the presence of gall stones, by the excessive use of rich animal food, by intemperance, and by other causes. Dr. Budd has shown
that dysenteric ulceration, or any inflammation of the tributaries of the Vena Portae, changes the blood with noxious matter which is very apt to provoke secondary inflammation on the capillary vessels of the liver.