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Thomas D. Wheatley
Phlebitis

May be described as inflammation of the venous tissues involving more or less of the venous system and passing on under certain conditions to diffuse suppuration.

The disease may be idiopathic or traumatic, more frequently the latter.

It has been divided for description into three varieties, viz. Adhesive, Suppurative, and Diffuse; some writers describe it as fibrinous and suppurative, while others speak of it in a general way, blending one with another as occasion demands. Hassel describes it as Primary and Secondary Phlebitis. This appears to be the most ready arrangement, and is the one here adopted.

Primary Phlebitis, the disease is restricted only to the venous tissues, and the train of symptoms are entirely local except the sympathetic fever which may accompany any local inflammation, it is comparatively an insignificant disease and seldom fatal.

Secondary phlebitis on the other hand, partakes more of the character of a general blood disease attended by fever of a decided asthenic type, and is generally fatal.

Idiopathic Phlebitis generally occurs in debilitated people, and mostly in the veins of the lower extremity.
The symptoms of primary Thrombosis are slight, by well marked; the inflamed vein is hard, knotted, swollen, and painful upon pressure, or motion of the limb; the knotted portions are found to correspond to enlargements opposite to the valves; there is considerable redness in the course of the vessel, and nearly always edema of the limbs, with more or less sympathetic fever, depending upon the extent of the local disease and the size of the vessel concerned. If the disease is in a deep seated vein as the Femoral or Thigh, there may not appear to be any marked symptom shown upon the surface of the limb; further than edema caused by obstruction of the vessel, together with stiffness, ooziness and slight pain upon pressure; and the mischief, may, in many cases remain unsuspected until the system has become thoroughly tainted, when the characters of secondary Thrombosis, suddenly unmask themselves. This is often the case after amputations. Still tracing the course of primary Thrombosis, the inflammation in the vein may not proceed further than, simple occlusion of the vessel by a plug, or plug of coagulated blood and lymph, and the symptoms may gradually abate, whilst the vessel may return to its original condition, or, it may be left as a hard cord-like
like Structure with total obliteration of the
channel, or, it may be left slightly pervious.
This form of Phlebitis is the Venous variety.
Another event may happen: some portion
of the coagulum included between two
other portions may suppurate, an abscess
forms, makes its way to the surface,
where, it can be calculated and drained
as an ordinary abscess, so long as the plug
between which, the suppurative process is in-
cluded, remains firm, no other mischief
results.

Or the protecting barrier may suppurate, or,
the whole mass may simultaneously un-
degy the same vessel, so that, it mingle
with the blood and produces the fatal
form, Secondary Phlebitis.
The extent to which veins inflames
varies greatly, in some only a few inches
have been found inflamed, whilst in
others, the whole trunk is found more or
less affected, but generally only that portion
the vein is diseased which is situated be-
tween the seat of injury and the next
collateral branch.

As to the mode in which inflammation
commences and the tinnies of the vessel
which first become involved, observers differ.
Chassse says, that veins are more prone to
inflammation, than arteries, owing to their double
function as vessels of return and absorption and from the irritated submucin of their contents.

But one can scarcely conceive this to be a valid reason, for there is much less tendency to disease, independent of any local affecting the veins, than arteries. Gaudin and others assert, that the external coat of the vessel is first affected, and Lee's experiments tend to show that it is the internal coat; however, when the inflammatory process develops itself, the internal and external coats become reddened, a considerable quantity of plastic effusion is thrown out on the internal coat, but it probably occurs after inflammation of the external coat had for some little time previously gone on, it probably commences on the external coat and gradually extends to the internal one; a good deal of lymph is thrown out external to the lining membrane as well as internal to it. As the lymph becomes coagulated, thickening of the tube results, at the same time the blood having acquired a tendency to coagulate, mixes with the exudation in the channel of the vein, coagulates, and forms a plug. This plug may extend for a considerable distance, both above and below the point of inflammation, so where it is once formed to an extent to obstruct the current of the blood, successive portions of blood reaching the clot also coagulate, the process continuing as far as the next collateral branch, that is, the point, at which it joins the trunk of the
affected vein.

In addition to these signs and consequences of Phlebitis, there are certain concurrent phenomena which require notice, namely accumulation of blood in the small veins and capillaries beneath the inflamed vein, a condition that and extends around this portion of the vessel; these are the consequences of occlusion of the inflamed vein. As the inflammatory process extends, the cellular sheath becomes inflamed, and passes on to the surrounding cellular tissue, resulting in secofibrins, superfluous and hemorrhagic exudations: besides this, we have congestive redness of the skin, which from the commencement accompanies inflammation of the subcutaneous veins, in the form of red streaks along the course of the vessel, and, as a final result, we have moist gangrene, caused by the stasis established in the capillaries from the extensive occlusion of the inflamed vein.

Nefi tonsely distinguishes the two kinds of Phlebitis, thus, one where the disease may be said to begin in the veins, the other, where it commences in the blood; he says: "Phlebitis (inflammation of the coats of the vein) is the primary disease, although it may be owing to various causes, while varying anomaly of the blood within the inflamed tube of the vessel, and still more, perhaps, beyond that spot, such, for instance, as the
coagulation of the blood within the inflamed vessel, is a secondary phenomenon, depending upon the product of the inflammation.

2nd At other times the coagulation of the solid mass of the blood within the tube of some one vein is the primary, and indeed the special occurrence, which gives rise, from reaction as it were, to inflammation of the coats of the veins; this he styles capillary phlebitis; the first kind is that which is confined or limited by organized lymph, the second is that kind which tends to pass on to diffuse suppuration.

It will be evident that any portion of the coagulum in the vein may undergo suppuration, and as before stated, runs its course, as an ordinary abscess; provided the barriers of lymph remain firm, the safety of the process, depending upon the plastic quality of the exudation and this of course, further depending upon the general condition of the system and very greatly, upon prevailing epidemic or endemic influences.

Now, supposing this protecting plug is not formed, or when formed, it becomes broken down and permits the inflammatory products to enter the circulation, or, as W. L. Lee says, that if the coagulum is disturbed, or if the poison be such as to hinder coagulation; if through some defect in the blood, firm coagulation does not take place, or if the coagulum, once formed, begins to break down, so as to allow the mixture of the fluid with
The circulating blood, certain other ill effects may follow, more particularly general contamination of the blood: this brings us to Secondary Phlegmatism.

Some writers consider this disease under the term pyrexmia, to be independent of Phlegmatism, and suppose that, it arises from pus having simply passed from the suppuring surface into the open mouths of the veins, and.

Several cases are quoted, where pus has passed into veins from suppuration in the cancellous texture of bone, and where, after death no inflammation of the veins could be discovered; others in opposing this view, assert

that there cannot have been inflammation of the veins but that it has escaped detection and they are disposed to view the effects almost as a specific disease of the blood, produced by the exudation of the veins and that exudation is not essentially pus.

The first symptoms which lead to the suspicion that the inflammatory products have entered the circulation are rigors: these are generally severe and long continued, followed by perspiration, they may be repeated at intervals, and in the intervals, the patient may experience no other unusual symptoms, or at the same time symptoms of a febrile character may make their appearance, usually the rigors occur, in such a manner from day to day as successive de-

fronts of pus takes place, that the disease
has been mistaken for remittent fever; they may recur at intervals, but generally cease about the third day, after which they recur at very uncertain periods, or are noticed no longer. Any open wound which may exist at the time, usually becomes foul and always, but often goes on granulating and looking healthy. Erichsen mentions a sweated smell of the breath, and which he says, is a marked symptom, of a very unfavourable character. The bowels become constipated and the urine scanty, and high colored, the pulse quick and feeble, and the face pale with an anaemic drawn look, but sometimes the countenance is flushed and the eyes bright. Pains may become felt in the joints and are at first, sometimes mistaken for Rheumatism. In a great number of cases the respiratory organs are implicated, the breathing becomes irregular and accelerated, there is a dry hacking cough and subcutisating râle. These chest symptoms appear, in paroxysms which are preceded by rigors, and are considered to be indicative of successive formations of pus in the lungs. There is dulness of the faculties with slight delirium, especially at night; about this time erythematous patches, may begin to make their appearance upon the skin, especially the face. There is now very great depression of the vital powers;
The pulse becomes small and the tongue brown, sordes accumulates upon the teeth, and there is low muttering delirium; usually from the sixth to the tenth day, diffuse suppuration begins to take place in the different tissues, joints, and organs. This may occur in the absence without occasioning any material pain, but in the joints it is mostly attended by considerable suffering. The progress of the disease is generally from bad to worse, sometimes rapidly, but at other times not resolute; notwithstanding so, there being remission, and apparent, though not real improvement, the patient waxes and death is ushered in by diarrhea, perspiration, dyspnea, and delirium, alternating with fever.

The following cases will illustrate the course of the disease and the appearances presented after death. The patients who had been in all these cases, the subject of surgical operation, or injury, were seized with repeated rigors, followed by pain in the chest, dyspnea, and cough; abscess occurred in the cellular tissue of different parts of the body, commonly not accompanied by much pain; typical symptoms supervened, and death was the too-frequent result.

On inspection the lungs were found
in various stages of pneumonia, whitish albuninous masses, or in other instances, cavities containing a purulent looking fluid, were discovered near the surface of the lungs and liver. Pleuritis was a frequent complication. Small patches of the veins were discovered in a state of purulent inflammation, but in no instance was the jalebite very extensive, nor were the large vessels involved implicated; during the prevalence of this disease, Erysipelas was prevailing in the town.

Case 125.

A man aged 32 yrs. admitted Oct. 25th.

The left arm having been torn off by machinery, above the elbow, amputation was performed about three inches below the shoulder. The stump granulated favourably, but the extremities of the bone somewhat projected, and there was a fungous growth from the medullary cavity. He appeared in other respects going on well, until the first week in November, when he complained of some pain in the left thigh and groin.

Nov. 5th. Had pain and tenderness in the left hypochondrium and sickness on taking food, pulse 140. Ordered leeches and a blister.

Nov. 7th. No tenderness felt better.
Nov. 9th. Had experienced repeated rigor, lay on his back, with the left thigh flexed, complained of pain and tenderness in the left groin, and along the course of the femoral vessels, as far as the popliteal space; there was some thickening, in, and around the knee, groin, and inside of the thigh, but no discoloration. Had pain upon pressure in the right hypochondrium, and in the epigastrium. Countenance flushed, with bearing an expression of anxiety, the skin warm and moist; tongue glazed and dry, with prominent papillae; sordes accumulated on the teeth; the pupils contracted, and the pulse sharp and intermittent.

Nov. 14th. Has been occasionally delirious. Sperm preserves a healthy appearance. The symptoms presented the same characters becoming gradually worse until Nov. 22nd when he died.

On inspection, the inferior lobe of both lungs, presented the appearance of red eruption, on section of which a purulent looking fluid escaped from the divided bronchial tubes. A cavity containing the same kind of fluid, was found at the base of the right lung.

The liver appeared healthy externally, but on cutting into it, a cavity of about the
size of a small cup, was discovered, about an inch from its upper surface, filled with a thick purulent fluid; the substance of the liver, around the cavity, was in a state of congestion. An abscess involving the glands of the left groin, which passed down four or five inches within the sheath of the femoral vessels and upwards into the pelvis, communicated with the interior of the hip joint on the same side, which was filled with pus.

At the stump, the bone projected about half an inch, and was tightly surrounded by the cicatrisation, beneath which, was a small abscess, extending into the axilla; the tissue surrounding the abscess was thickened and black, and the veins opening into it were inflamed for about a quarter of an inch from the extremities.

Case 2nd

A Labourer aged 63 yrs. Admitted Oct 18th, with compound fracture of the left leg. Amputation was performed above the knee on the same day. She died on the 27th of October. On Post mortem examination the stumps appeared in a sloughy condition. The Sartorius and Adductor muscles
were infiltrated with pus along their entire extent, the femoral vein, for the extent of about two inches from the divided extremities, was in a state of purulent inflammation. With the exception of Oedema of both lungs, and patches of incipient Pneumonia, no visceral disease was found.

Case 3.

A Baker, aged 45.
Admitted with cysts on the right arm following a slight injury, rendering amputation necessary. Death took place Dec 19 47. Post-mortem appearances were. An abscess was discovered in the right axilla, and the substance of the right pectoral muscle, was infiltrated with pus. There was also a large collection of matter in the left thigh, communicating with the cavity of the knee joint, the cartilages of which were partially eroded.

The Pulmonary pleura of both sides, were covered posteriorly with a thin layer of coagulable lymph, both lungs were edematous, and on the posterior aspect solidified, putting dimpling in water.

Case 4.

A mean aged 38 yrs.
Admitted Oct 42, with compound
fracture of left foot and dislocation of the hip on the same side. The foot was amputated above the ankle, and the hip reduced the same day. He died Oct. 29th.

Post-mortem. The organs presented a darkly appearance: the capsular ligaments of the left hip was ruptured, and the capsular ligaments much lacerated posteriorly; the cavity of the joint was filled with pus. The lungs were much congested, the liver and posterior portion of both, were in a state of red hepatization, containing numerous nodules of firm albuminous matter a little softened towards the centre, varying in size from a few to a large knot. Both pleurae to an extent nearly corresponding to the solidified lung, were coated with a thin layer of yellow lymph. The liver on its upper and posterior aspect, was much congested and shredded through-out, with white masses similar to those in the lungs, but of softer texture. No phlebitis was discovered, but the injured leg was not very carefully examined.

Case 5-
A man aged 50.
Admitted Oct. 7th with compound fracture of the left leg. Died Nov. 4th.
Post-mortem. The wound of the leg...
found disfigurating and containing the fractured ends of the bones. On drawing off about one inch from the fractured extremity of the tibia, numerous points of pus were seen on the cut surface in the cancellated texture of the bone. The veins of the leg were carefully examined but presented no trace of inflammation. The lungs were congested and edematous; the bronchial tubes were generally inflamed. Near the posterior surface of the base of the right lung, were patches of lobular pneumonia in some cases surrounding patches of whitish alveolitis; in others the interior was occupied only by a more interstitially congested portion as if preparatory to effusion. Some of these changes were also perceptible to some extent on the left side. The pulmonary pleura of the left side, right side was coated with a thin layer of lymph, and a similar effusion had taken place on the peritoneum lining the convex surface of the liver. The appearance of the liver was similar to that described in Case 4.

Case 6.

A man aged 56,
Admitted Nov. 12 with disease of the breast.
joint computation was performed through
the condyles of the femur. Every thing
went on subfebrarily until Nov 9th,
when he had a rigors, which lasted about
an hour followed by sweating. The last
rigors was removed on the 8th. He
took his food well.
Nov 10th another rigors succeeded by
profuse perspiration; the stings became
gainful and slightly, and discharged
a good deal of dampened - purulent fluid.
But there was no appearance of reddess
in the course of the veins, although pain
was tenderness upon pressure; he com-
plained of what he called rheumatic
pains in the forearm and a sense
of fatigue in the left leg and thigh.
He had no pain in his chest but ex-
created a good deal of frothy phuor.
Nov 13th He suffered a good deal, and
complained of pains in the shoulder on
moving the arm. The granulations on
the stump looked fluid, the stumps
having entirely separated; the plufs were
a good deal retracted.
Nov 15th He had several rigors, was very
restess, expectorated quantities of frothy
mucous, and gradually sank.
Post-mortem. The skin was yellow;
the glands in the groin were considerably
enlarged; the internal saphenous vein was healthy. There was no fluid in the muscles of the thigh; the femoral vein from the thigh to the saphenous opening was very much thickened and filled with greasy fluid; the distal end was puerulous, and the disease stopped abruptly at the saphenous opening. The brachial, inferior and superior clavicular, posterior, cephalic, basilic, radial, and ulnar veins were all healthy. In the right elbow and wrist and in the right knee and ankle joints, was found pus, also in the extensors of the right arm, and the sheaths of the flexor tendons of the forearm.

Various theories have been advanced as to the cause of death in secondary phlebitis or Pneumonia amongst which, is one that went to show, it was caused by the inflammation gradually extending along the veins till it reached the heart and so paralysed the heart. But the more recent researches of Lee Bowland and Covillier, I. S. found out that the real cause, is the morbid condition of the blood induced by the entrance into the circulation of the inflammatory products of the inflamed vein, the result of which is inflammation terminating in
in suppuration in various organs of the body. Some Pathologists say that
this mineral condition of the blood, existing simply in its admixture with pus, as this condition being requisite to produce
the effects, i.e. the formation of pus; but the great disproportion between the quan-
tities found deposited and the small quantity frequently found at the seat
of the local affection, discontinue this view; then, to account for this, they say
that the pus is secreted by the lining membrane of the veins, measuring a considerable surface of the venous
system not involved in the primary
local affection, but the general appearance
in the veins after death, do not support
this view. The views of the Pathologists
before mentioned appear most reasonable
and the explanation they give most satisfactory, in fact, they place beyond all doubt
that the development of pus is chiefly derived
from the blood, the constituents of which
have previously undergone a change, owing
firstly, to its admixture with the inflamma-
tory products which have entered the
circulation at the seat of local disease,
and also probably, in most cases, from
certain epidemic or endemic influences
rendering the system more liable to
undergo this change.
The alteration in the blood consists
in having floating in it, not only
fins, but also certain corpuscles capable
of being converted into fins, besides the
fibrous constituents, have acquired an increased tendency to evacu-
ation.
We have only to deal now, with the
mode in which these formations of
purulent matter take place, in the tissue.
Lemmermann says, that the pus corpus-
cles either reach through the heart and
pulmonary arteries into the capillary structure
of the lungs or in case the purulent depo-
sition was seated in organs whose veins
formed the vena portae, they reach through
these into the capillaries of the liver.
Now as the pus corpuscles are in gene-
ral too large to pass through the fine
capillary net work in the lungs and
liver, it is evident, they must stop here,
to accumulate and form a states, as
foreign irritants. These, then, form new
pus depositions which progressively become
greater, from the constituents of the blood and
of the parts of the tissue capable of it.
From this simple cause it is easy to
explain why secondary abscesses form
so readily in the liver and lungs.
If the pus deposited in the liver, and

newly formed, be taken up by the he-

patic veins there, bring it into the heart

and lungs. If it be taken up by the

gastric veins from there, it may

be deposited in every other organ to

which the blood comes from the left ven-

tricle. In this case secondary abscesses

may form in the brain or the kidneys

or the spleen &c, and pus may even be

discovered in the urine.

Professor Miller says that the chief ob-

jection to this mechanical view is that

pus corpuscles are not in general today

to pass through the capillaries.

On microscopic examination of the softened

interior of the abscesses in the before men-
tioned cases, it was found to consist

of granules and granulated corpuscles,

coveting in a peculiar manner the

addition of acetic acid, and containing

no appearance of unaltered pus corpuscles.

A very similar morbid effect has been

induced by Ardel and other pathologists

by the injection of extraneous substances,
as mercury and produced charcoal into

the veins of animals; in these experiments

a small particle of the foreign body was

found in the centre of each inflamed

lobule. This to a certain extent corroborates
Zimmermanns view as to the immediate cause of the granular deposit, but the subsequent formations are more dependent upon the tendency which the blood has acquired to undergo coagulation. It doubtless granular corporcles which are found in these deposits are merely exudation cells in process of transformation. This then appears to be the mode of formation. The globule of pus in the capillary may be regarded in the light of the foreign body as in Andrews's experiment, it becomes the centre of a centre of irritation, stasis and coagulation of the blood, in the vicinity result, and then the whole mass may subsequently become transformed into pus. The granular bodies which are found are probably exudation corporcles which have not completed their metamorphosis.

The treatment of Phlebitis is very obvious. In the first instance general antiphlogistic treatment must be adopted with great care; the withdrawal of blood by leeches from the inflamed vein, is attended with benefit, together with rest, fomentations, and poultices; should abscesses form they should be opened early. The treas well cleared out and opinion given to allow irritation.

In the secondary form, the symptoms
should be treated according to the organs affected, keeping the object in view of supporting the patient as much as possible with nourishing diet and stimulants, so as to assist the constitution in its struggle with this terrible malady.

Thomas T. Wheatley.

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