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Hernia.

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Hernia

The tendency of all classes and ages of both sexes to become affected with this disease is well known. By some it has been computed that one in every fifteen of the whole human race labours under hernia, and, by others the proportion is stated to be as high as one in every eight.

It must therefore be of the greatest importance that the surgeon should be intimately acquainted with a disease so common, in all its forms and conditions.

No two cases of hernia are exactly alike; they have all their individual characteristics, and almost every new case will teach some new point in the treatment.

It is not one of those diseases which the practitioner can always shift on to the shoulders of another.

He may be placed in circumstances which render the obtaining of professional assistance impossible; as for instance when in practice in the country, or on board ship, and he should therefore be always prepared to act promptly on his own responsibility, for upon the accuracy of his judgment and the skill of his hands may depend the life of his fellow-creatures.

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Hernia is a displacement, partial or complete, of

any viscus from its proper cavity, not occurring at any of the natural outlets of the body nor as the immediate result of a penetrating wound.

As there are three principal circumscribed cavities of the body, so there are three general divisions of hernia, viz: of the Head - of the Chest - and of the Abdomen.

The last mentioned is by far the most common, and forms the subject of this paper.

When a viscus is protruded from the abdominal cavity, through one of the hernial openings, it generally pushes before it a portion of peritoneum which is then called the hernial sac, and this sac is divided into a mouth, a neck, and a body terminating in a fundus or base.

There are four usual forms of sac, viz: the cylindroidal, the spheroidal, the pyriform, and the conoidal; by different

(see page next)

combinations of these, however, many other forms are produced. The sac does not exist in all herniae; in those of the Caecum and bladder it is only partial or may be wanting altogether.

For some time after its descent the sac differs in no way from healthy peritoneum, but after a time it undergoes some important changes. The first of these is the conversion of its areolar into fibrous tissue. This occurs most frequently at its neck, but the whole body has been found to have undergone this change.

The sac sometimes becomes opaque or covered with dark spots. When inflamed it secretes lymph which forms adhesions between it and its contents, making the hernia irreducible, or forming fibrous bands, giving rise to stricture. It sometimes secretes large quantities of serum, constituting what is called dropsy of the sac.

contents of
hernia

A hernia may be formed by any the abdominal viscera, but those most frequently protruded are the Ileum and the Omentum.

The Bladder, Uterus, Kidney, spleen, liver, stomach,

and return have all been found to form hernial tumours, and these tumours have received different names according to the viscera contained within them. — Enterocele, containing intestine; Epiplocele, containing omentum; Enteroepiplocele, containing both omentum and intestine; Cystocele, containing bladder; Metrocele, containing uterus; &c. &c.

causes The causes of hernia are predisposing and exciting, the former being the result of a diminution in the resistance of the abdominal walls; the result of an increase of the pressure of the viscera. The larger the hernial opening, the more likelihood is there of a hernial protrusion at that opening. Thus inguinal hernia is more common among men, than among women, because men have larger abdominal rings; while women are more subject to crural hernia because in them the crural arch is deeper and wider.

Whatever causes the natural calibre of the openings to become enlarged, as pregnancy, obesity, &c., or whatever tends to diminish the size of the muscles and tendons passing through these openings, as emaciation, predisposes to
Hernia.

In women the disease occurs most frequently after the age of 20, and in those who have borne many children, their abdominal walls having become relaxed by these pregnancies. In old men, too, the relaxed state of the muscles predisposes to hernia.

Straining
causes

Straining, which is a violent action of the abdominal muscles and diaphragm simultaneously, is a very common exciting cause of the disease; but there are many other exciting causes, such as violent exercise of the body generally, lifting heavy weights, coughing, &c. &c.

There are three conditions in which hernia may exist - the reducible, the irreducible, and the Strangulated.

reducible
hernia

A tumour occurring at any of the usual hernial sites - the scrotum, groin, labium or umbilicus - may be regarded as a hernia if it be soft and elastic, more or less firmly attached at its base, the skin covering it moveable over it, and not changed in colour; if it increases in size when the patient is in the erect, and diminishes when he is in the recumbent, posture, or when pressure

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is applied to it, and if it has formed suddenly after violent muscular exertion, or under any of the other circumstances already described as usually attending the occurrence of this form of disease. And it may be known to consist of intoshin when it becomes tense, and communicates an impulse to the hand during the exertion of coughing, when rumbling noises are heard in it and a clear sound is emitted on percussion over it. ~~When~~ When it can be easily returned within the cavity from which it has been displaced it is said to be reducible; and, as, in this state, the displaced parts undergo little or no pressure from the margins of the aperture through which they have been forced, their functions are usually very little, or not at all interfered with.

ducible
Hernia
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A hernia is called irreducible when it cannot be pushed back into the abdomen, its return being prevented by other causes than stricture.

causes
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These causes are, increased volume of the hernial contents, and adhesions of the parts to each other or to the hernial sac.

The former occurs most frequently in hernia of the omentum, the increase in volume being generally due to simple hypertrophy - the result of long residence in the sac - and by which it is often so changed as to bear almost no resemblance to its natural structure.

The latter - adhesions of the parts to each other or to the hernial sac - are usually found in hernia of old standing which have never been interfered with, and are probably always the result of inflammation.

mosis
of
ducible
hernia
2

From the fact of an irreducible hernia not disappearing during recumbency or upon pressure, the diagnosis is more uncertain than when the disease is in a reducible state, but, if the early history of the tumour be enquired into, it will generally be found to have been reducible at first; and we are thus enabled to come to a pretty correct conclusion as to its nature.

A patient labouring under irreducible hernia is always in danger, from strangulation, from obstruction, or from inflammation.

regulate
ducible
hernia
2

Strangulation may be the result of inflammation, but it is usually caused by an

additional descent of the hernial contents.

When the intestine is bound down by adhesions to the hernial sac it sometimes forms an angle more or less acute, thus causing a mechanical impediment to the onward progress of the intestinal contents; and this is called Obstructed hernia.

It usually occurs in hernia of long standing and large size, and may exist quite independently of inflammation or strangulation, although it may be followed by either.

The symptoms are constipation and vomiting with heat, pain, and sense of tension of the tumour.

Inflammation of the contents of an irreducible hernia may arise from very slight causes, and, when it does arise, the symptoms are very similar to, and might easily be mistaken for, those of strangulation.

There are however some points of difference which will enable the surgeon to distinguish between the two. "In inflamed hernia the pain is, in the first instance, referred to the body of the tumour; while in strangulation, when the hernia is large, the site of

Obstructed
hernia

Symptoms

Irreducible
hernia

9.
"the stricture is more particularly the seat of
"pain. Again, in inflamed hernia, the
"ring is generally free from tension, whilst
"the swelling itself is tense."

Inflammation, like obstruction, occurs usually
in herniae of large size, and, although
it may be found in any of the different
kinds of the disease, it is most frequently
met with in the umbilical.

Strangulated
Hernia
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Hernia is said to be strangulated when
it is subjected to such constriction at the
outlet as to prevent the passage of the
intestinal contents, and to occasion inflamⁿ.
In more severe cases, the constriction becomes
so tight as altogether to arrest the circula-
tion through the strangulated parts.

The former condition is called by Sir Charles
Bell incarceration, and the latter only, stran-
gulation. There does not seem however to be
much reason for this division, as there is
no definite line to be drawn between them,
and the one generally passes into the other.
Moreover, it is of no practical importance
as regards treatment.

Strangulation may occur at any period of

life, from infancy to extreme old age,
but this complication is most common in
herniae which have existed for some time,
and, the older the hernia the greater the
danger of its becoming strangulated.

A constricted hernia may exist for weeks
without any urgent symptoms appearing,

but, a further sudden descent of gut
may at once cause perfect strangulation;
or the generation of gas, or the accumula-
tion of feces in the portion first protruded
may have the same effect: the result being,
as already stated, arrest of the circulation
through the strangulated parts followed
by gangrene.

parts of
stricture

The stricture may be formed, by the sac, or
its contents, or by the parts external to the sac.
In herniae of long standing, and for which
trusses have been worn, the neck of the sac
often forms the stricture. This has been dis-
puted by some surgeons, but, the fact, that
there are many instances on record of the
gut and its sac being returned within the ab-
domen together, and the strangulation
still continuing, would tend to prove it.

The body of the sac may also be the seat of stricture, as described by Scarpa and Mr Lawrence - but Mr Teale thinks that in all such cases of strangulation, apparently caused by the body of the sac, the constricting part is the original neck of the sac pushed downwards by a first hernial descent.

The omentum may be the cause of stricture in various ways, as described at considerable length by Scarpa. A case is recorded of strangulation of the intestine through a fissure in the omentum; and an indurated band of this substance has been known to produce the same effect.

The parts external to the sac which form a stricture are natural hernial openings, and the sheath of the femoral vessels; the former most frequently in most kinds of hernia.

An accidental hernial opening through the ^{tendinous} fibres of the transversalis muscle has been known to construct a direct inguinal hernia.

*effects of
strangulation*
The first effect of strangulation on the protruded bowel is, as already stated, congestion, followed by inflammation, and, if the stricture be not relieved, ending in gangrene.

The congested portion becomes discoloured, brown,

purple, or even black, and this last may occur from congestion alone without gangrene having set in. The tumour becomes more tense and increases in size from the effusion of serum into the sac, and the generation of gas within the gut.

On the congestion passing on to inflammation, the peritoneal surface of the intestine becomes more or less glued to the sac from the effusion of lymph, and the serum in the sac becomes thickened from the same cause.

If the stricture continues unremedied the bowel becomes gangrenous, either altogether or in patches, the colour of the dead part being grey, green, or black.

A like result follows strangulation when the sac contains only omentum.

The sac itself sometimes becomes inflamed, and from it the inflammation extends to the integuments which become red, livid and ultimately gangrenous. A communication is thus formed between the perforated bowel and the exterior of the body, through which the feces are discharged, and the life of the patient may thus be saved by nature, unaided.

changes
within
abdomen

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Besides these changes which take place in the hernia and its coverings, others are observed to occur within the abdominal cavity.

The peritoneum becomes inflamed to a greater or less extent, depending in a great measure on the constitution of the patient. Besides this the intestine above the stricture may become inflamed and even gangrenous.

The symptoms of strangulated hernia are - obstruction to the passage of the intestinal contents, vomiting, flatulence and pains in the bowels, and tenderness on pressure.

In the tumour itself, pain, tension, and in the advanced stages redness and swelling of the integument.

symptoms

2

When strangulation is complete, the peristaltic action of the bowels above the stricture becomes inverted, and, after the stomach has discharged its own proper contents, the contents of the upper intestine may be evacuated, until the matter vomited becomes stercoraceous. This however does not prove that the matter vomited has proceeded from the large intestine since the contents of the small intestine may become fecal as the result

of stricture.

Peristaltic action usually ceases in the lower bowel on the occurrence of strangulation, incapacitating it from emptying itself, so that an evacuation may be obtained by having recourse to an enema, although the stricture is complete, and no passage can be obtained by the administration of purgatives.

When the stricture is not very tight the pain in the tumour is not great, when however the constriction is complete, the pain is usually severe from the commencement, and increases in severity, untill gangrene sets in when it suddenly becomes mitigated or ceases altogether.

In strangulation of the omentum the symptoms are generally less severe. It is not always attended by constipation, and when it is, it happens as the result of the peritonitis which has supervened. Vomiting is less frequent, and, unless there be extensive peritonitis, not so urgent a symptom, the pain and tension also, both in the tumour and in the abdomen are more moderate.

Strangulated
hernia

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The Treatment of reducible hernia is palliative or radical.

The first comprehends the return of the protruded parts within the abdomen, and their retention there by means of mechanical appliances.

That best fitted for this purpose and most generally used is the Truss, which consists of a

band or belt to surround the body, and a pad suited to the form and situation of the hernial opening. The material best suited

for the construction of the band is steel, its elasticity causing continued pressure to be kept up in whatever position the body may be placed. It should be covered with leather to prevent chafing of the skin.

The pad should be somewhat larger than the aperture over which it lies, and of a different form according to circumstances.

It may be made of wood, cork, ivory, metal, indiarubber or gutta serena; but, whatever material is used, it should be covered with soft leather.

If the Truss fits accurately, and is constantly worn so as never to allow the gut to protrude, the neck of the sac, and the aperture

through which it has passed may become closed, so that the palliative treatment of a hernia may result in its radical cure, although this does not often take place.

Medical cure Many operations have at different times been invented and practised for the radical cure of hernia.

Among these may be mentioned —

The incision of the sac;

Excision of the sac;

Ligature of the sac;

Excision of the Testicle;

Canterization of the sac;

Acupuncture &c. &c. &c. — but all these have fallen into disuse, and the operations generally performed now, are Inagination, and subcutaneous incision.

The former was first performed by M. Gordy, who uses a curved needle fixed in a handle, and moveable within a sheath; near the point of this needle there are two holes drilled, and between these two holes, on its convex surface, there is a hollow to contain a ligature. The operation itself is described as follows — "The patient being placed in

"the horizontal position, the surgeon, having
 "reduced the hernia, pushes with the fore
 "finger of the left hand a pouch of intes-
 "tine upwards into the inguinal canal.

agitated, "The point of the needle, armed with a ligature,
 "is then guided along the finger to the bottom
 "of the pouch, and, by depressing the handle,
 "is brought out through the anterior wall of
 "the inguinal canal; one end of the ligature
 "is then laid hold of by an assistant, and, the
 "point of the needle being withdrawn, ~~into~~ a
 "second similar perforation is made at a few
 "lines distance from the previous puncture.
 "In this manner both ends of the ligature are
 "carried, from the inside of the pouch, through
 "the inverted skin, the tendon of the external
 "oblique muscle, and the integuments of the in-
 "guinal region, where they are tied over a piece
 "of bougie: one or more of these stitches are
 "made, according to the size of the opening.
 "Caustic ammonia is then freely applied to the in-
 "ternal surface of the pouch, and the opera-
 "tion is concluded by covering the parts with
 "a slight compress spread with common cerate."
 "In a few days, when suppuration is established,

the sutures should be removed; Adhesion gradually takes place, and the pouch becomes obliterated by granulation, the result of the application of the Caustic.

When the suppuration has ceased, the inguinal canal ~~is~~ felt blocked up by a thick plug, which gradually disappears, and the only trace of the operation left, is a cicatrix at what was the mouth of the pouch, and a shortening of the scrotum on that side. The patient should remain in the recumbent posture for a month, and ~~wear~~ wear a truss for some months afterwards.

This operation has been modified by using horse lip pins, and the twisted suture to fix the invagination.

subcutan-
section

Scarifying the neck of the sac by subcutaneous incision was first practised by M. Velpeau; but it is not so satisfactory in its results, and is more dangerous than the other operation; for, whereas peritonitis often occurs after it, that complication has never, or very rarely, supervened upon invagination; other circumstances may arise, however, after the performance of the latter operation which

may place the life of the patient in danger. A good many instances are recorded of its terminating fatally, and in many more, after ~~the~~ recovery from the operation, the hernia was found to have reappeared.

Taking these circumstances in account then, the operation for the radical cure of hernia should never be attempted, unless "the inconvenience and suffering caused by the hernia" are so great as to interfere seriously with the "patients' avocations, comfort or health." and when all attempts at palliative treatment have failed.

This rule, however, does not seem to apply to Umbilical hernia, the operation for the radical cure of which, as performed by Mr. Barnwell appears to be both simple and safe - It will be described when this particular variety of the disease comes to be treated of. The principal object in the treatment of irreducible hernia is to convert it into the reducible state, and the means used for this purpose must be different according to the cause which has rendered the hernia irreducible.

operation

treatment
of
irreducible
hernia

If that cause be adhesions, the probability of the hernia being rendered reducible is very small, but it may be, either by the elongation of the adhesions, or the invagination of the sac.

The means used to bring about these changes are rest in the recumbent position, and pressure.

The latter is applied by means of a truss with a hollow pad, the concavity of which is lessened every few days until its surface is plane, and afterwards a convex pad may be worn.

Although this treatment is not always to be relied on for converting an irreducible into a reducible hernia, still, many instances are recorded of its perfect success.

When a hernia is irreducible from hypertrophy, its size may sometimes be so reduced as to render it reducible, by the use of purgatives, bleeding both local and general, the application of cold, low diet and the recumbent posture.

When purgatives are used, it requires to be frequently repeated. Bleeding can only be practised when the patient is strong and robust, it is not admissible in those who are weak or unhealthy.

That any benefit may result from the application of cold it requires to be long continued. Ice therefore cannot be used for this purpose as its continued application

would, and has been known to, result in gangrene of the integuments.

The most efficient way of applying long-continued cold is by ~~Evaporation~~.

When omentum constituted the hypertrophied contents of irreducible hernia compression may reduce its size, and this may be applied by means of strapping, or, as recommended by Mr Arnott, by a compress filled with air.

These methods of treating irreducible hernia are usually successful when the disease is comparatively recent, and not of large size, but many instances are on record of their success, even when the tumour was of very large size and old standing.

The objects indicated in the treatment of Strangulated hernia are the relief of the protruded parts from the constriction, and their replacement in their natural position within the abdomen. There are two proceedings for the accomplishment of these purposes; the taxis, and the operation of dividing the stricture with a knife.

"The Taxis consists essentially in the methodical manipulation of hernia for the purpose of effecting their reduction."

Strangulated
Hernia

In performing the taxis, the patient, having previously had his rectum and bladder emptied, should be laid on his back in such a position as to cause relaxation of the muscles of the abdomen. ~~and after~~

"If the tumour be small the surgeon surrounds
" it with the ~~the~~ tips of the fingers of the right hand,
" distributing them over its surface, so as to produce a
" uniform pressure, but, if it be large, he grasps
" the tumour with his whole hand and fingers—
" whilst the right hand is thus occupied in gently and
" steadily compressing the body of the tumour, the
" thumb and one or two fingers are applied to
" its neck, and have a somewhat complicated duty
" to perform, being employed in preventing the
" tumour from being doubled over the edge of
" the stricture by the pressure of the right hand in
" pulling down the upper part of the tumour, so
" as to render the sac and the tendinous aperture
" tense and smooth; and sometimes in moving it
" from side to side so as to disengage the constrict-
" ed parts."

If the hernia be very large both hands may be required to grasp the tumour, and, in this case, an assistant will be necessary to manipulate its neck.

If by the pressure of the right hand the
engorged vessels of the hernial tumour are
emptied and the contents of the intestine pushed
back into that part which is within the abdomen,
the size of the protruded parts becomes dimin-
ished and reduction will then be effected;

but, if this should not take place, the pressure
must be gradually increased and directed more
particularly towards the stricture, that being the
point of resistance.

Should reduction not be effected after the employment
of the Taxis for a reasonable length of time, there
are certain auxiliaries which are used to promote
its efficiency.

Abdominelling is one of the most powerful of these
and should be practised urgere ad deliquium.

The muscles of the abdomen thus become more
relaxed, and offer less resistance to the re-
turn of the tumour, which becomes softer,
and if inflammation have begun, it is mitigated.

The hot bath also acts by relaxing the abdominal
muscles: it should be used at a temperature
of 100° Fah., gradually raised to 110°, and the
patient kept in it till he feels faint.

Tartar emetic in nauseating doses is a useful

auxiliaries
to
Taxis

r. S.

Bath

adjutant to the Taxis, but the most powerful of
 all is Tobacco. It is usually injected into the
 rectum in the form of a decoction or infusion.
 Half a drachm of Tobacco leaves infused in half
 a pint of boiling water may be introduced into
 the rectum of an adult and repeated if necessary.
 The usual effects of a Tobacco enema upon the
 system are "depression of the pulse, nausea
 and vomiting, extreme sense of languor, com-
 plete prostration of voluntary muscular power,
 cold sweats and fainting," but it is at all
 times an uncertain, and, sometimes, a very dan-
 gerous, agent to employ, for there are many
 cases on record where death has resulted from its
 administration even in very moderate quantities.
 Cold is also a valuable auxiliary to the Taxis -
 it may be employed by the application of ice,
 but, as already stated, it cannot be used for
 any length of time without the danger of pro-
 ducing gangrene. It has been recommended to
 introduce lumps of ice into the rectum, with a
 view of allaying the sickness and vomiting
 as well as to promote the reduction of the
 hernia. The best way of applying cold to the
 tumour itself is by a stream of water from a

Tobacco
 enema
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Cold.
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Nettle or by the evaporation of Ether.

Opium is useful by diminishing the sensibility of the tumour, and may be used along with venesection or the hot bath.

It has been proposed to puncture the strangulated gut for the purpose of emptying it of its gaseous contents, but this result is generally to be obtained and with greater safety by the use of cold applications.

The evacuation of air from the rectum by means of a long flexible tube, is sometimes practised, and instances are recorded of its success.

Under no circumstances perhaps is Chloroform of greater benefit than in the reduction of strangulated hernia.

Chloroform By it the same condition of the patient is obtained as by bleeding, hot baths, and tobacco enemata, without their injurious effects. Numerous instances are recorded of its perfect success after all the other means had failed, and it has the advantage of relieving the patient ~~from~~ the pain accompanying the necessary manipulation when the taxis is performed.

A method of reducing strangulated herniae without operation, after other means have failed, has of late been practised with much success, and consists in simply inserting the patient. A case is related by

D.^r Power, when, after having in vain endeavoured to reduce a hernia by steady pressure, he says -
 "recollecting the plan which was rediscovered or
 "reintroduced by Mr. Jeph of Cheltenham, and of
 "which several successful instances are on record,
 "I obtained the assistance of one or two of the students
 "and placed the patient on his head. On again
 "gently compressing the tumour I had the satisfaction
 "of feeling it quickly recede, and in less than a
 "minute it entirely returned with an audible gurgle."

Mr. Whalley of Bradford relates a case to which he was
 summoned, when he found that the patient had
 "drawn his bed with its head to the wall, and was
 "making desperate efforts to stand on his head; and
 "when by persevering efforts this point was achieved,
 "he rested a few seconds, wriggled his body, then
 "assumed the natural position, and rubbed
 "the protruding mass of bowels &c, and then re-
 "newed the process until success crowned his efforts."

This man had had a large ventral hernia for 20
 years, and, whenever he had any difficulty in re-
 turning it, had adopted the measure detailed above
 and with a ^{successful} result fourteen or fifteen times.

Besides these there are many other cases recorded
 where, the taxis having previously failed, the

bowel has been easily returned by pressure during the inversion of the patient, or has returned of its own accord without any pressure at all having been used.

ration

When every other means for the reduction of a strangulated hernia, ~~as~~ as far as is consistent with safety, have been used, and without success it becomes the duty of the Surgeon immediately to divide the structure by operation, provided the patient be not actually in articulo mortis. No time should be lost, as increased inflammation and gangrene of the part are produced by the continuance of the constriction.

Under such circumstances the death of the patient should not be looked upon as the result of the operation, but of the inflammation existing before its performance, and which would not have existed, at least to such an extent, had it been performed sooner.

"The danger to which the patient is exposed by the operation is less than that which he undergoes by delay." — "The result of the operation, under any circumstances, is uncertain, but its unfortunate termination arises in many cases from its being delayed until the state of the protruded

"parts, or of the system, leaves little chance of success." Continental surgeons are said to operate much sooner than is usually done in this country, and to save many more patients. The following quotation from the "Practical observations" of M. Hey shows the danger of delay and the advantage of operating early. He, in the commencement of his professional career looked upon the operation as a last resource, and says — "by this dilatory mode of practice I lost three patients out of five on whom I operated, — having more experience of the urgency of the disease, I made it my custom, when called to a patient, to wait only about two hours to try the effect of bleeding and the tobacco clyster. — In this mode of treatment I lost about two patients in nine on whom I operated, and this comparison is drawn from cases nearly similar."

operation = There are two important modifications of the operation for the relief of ~~strangulated~~ hernia founded upon the seat of the stricture: the operation without opening the sac, and that involving the opening of the sac.

The former is applicable only to cases in which the constriction is formed by ligues external

to the sac ; the latter in cases in which it is formed by the sac itself, or its contents.

The advantages derived from the performance of the operation without opening the sac ^{are} the avoidance of opening a large serous cavity and the non-exposure of the viscera to the atmosphere and to direct manipulation, to which two circumstances most of the fatal results of the other operation for strangulated hernia are due. It has been stated however, that the advantages of this operation are counterbalanced by the evils which may attend it. The evils to which it is supposed to be liable are - the risk of returning the intestine or omentum in a state of gangrene, and the reduction of the hernia and its sac in mass ; neither of these accidents however ought to happen in the hands of an experienced surgeon.

The symptoms of gangrene ~~being~~ ^{are} sufficiently apparent, both from the state of the tumour, and the general condition of the patient; and the return of both hernia and sac in mass can scarcely occur. when ordinary care is used, as the surgeon, having reached the sac, and relieved the stricture, would not at once proceed to push both the sac and its

contents back into the abdomen, but would manipulate the sac so as to empty of its contents first.

Should it be found, after having exposed the sac, that the stricture is not caused by the parts external to it, the sac may then be opened and the ordinary operation proceeded with.

Mr Key says "A prominent character of the operation, and one that raises it above many of the operations that have been brought against it, is, that should the attempt to execute it fail, either from want of dexterity on the part of the operator, or from any peculiar difficulty in the case, the operation can be completed in the ordinary way, by laying the sac open."

Mr Teale advised the performance of the operation without opening the sac in all cases where it is practicable, unless the local or general symptoms indicate the existence of gangrene, or an advanced stage of inflammation; and, in accordance with this opinion, he states as a general rule, that the operation should be attempted - in most cases of large hernia - in many hernia of middle size, - in but few small hernia, unless in the earliest stages of strangulation.

A modification of this operation has been practised

successfully when the stricture is produced by the sac itself. It consists in making a very small opening in the sac, introducing a director, and dividing the stricture from within.

If the patient be not actually dying, no stage of strangulation, as already stated, is too far advanced for the performance of the operation involved in opening the sac.

The instruments required are a common scalpel, dissecting forceps, a curved grooved director, a probe-pointed bistoury and a hernia knife. Of the last there are many different kinds, some with concealed blades, but that devised by Sir A. Cooper is perhaps the best - it is blunt at the end for half an inch, has then a cutting edge for three quarters of an inch, and is again blunt along the rest of its concavity.

The patient being laid in the recumbent posture, and in the position most convenient for the Surgeon, the hair is shaved from ^{the} parts; an incision varying in extent and direction according to the different size and species of the hernia is made by pinching the skin into a fold, transfixing it by a scalpel at its base and dividing it by cutting upwards.

The subcutaneous cellular tissue should then be carefully divided, and next the deeper seated structures layer by layer, untill the sac is reached, which should then be pinched up between the finger and thumb, and rubbed together, to make sure that none of the protruded parts are included.

If the swelling is too tense to allow of this proceeding, the membrane must be raised with the forceps, and opened with the scalpel held horizontally. The opening should then be enlarged in both directions with the probe pointed bistoury on the director to the extent necessary.

As the sac generally contains serum, the escape of this fluid will always show that it has been penetrated.

The next proceeding is to ascertain the seat of stricture by passing the finger towards its upper portion. If the stricture will admit of the tip of the forefinger, it should be passed behind it, and on it the hernia knife introduced with its flat side resting on the finger.

When the blade has entered the constriction, its edge is turned up and the resisting band divided. The division of the constriction requires to be made in different directions according to the species

of hernia. When the stricture is so tight that the finger cannot be passed through it, the director must be employed on which to pass the knife. Where there is inflammation of the peritoneum inside the abdomen going on, there will, on the division of the stricture, be an escape of a greater or less quantity of clear strawcoloured, or sanguineous, serum.

Having exposed the strangulated ~~bowel~~ viscera they must be carefully examined to ascertain their condition, with a view to their subsequent treatment, but before doing this ~~and~~ an additional portion of the intestine should be drawn ~~down~~ to ascertain whether it has suffered at the point of constriction.

When the circulation of the intestine has been affected by the constriction, there will be discoloration, and the amount of this will of course depend on the amount of pressure.

The intestine may be found of a red, brown, claret, chocolate, or livid colour; and these tints pass gradually into black as the circulation becomes altogether obstructed.

When the discoloration is slight, or only in patches, the gut may be returned with safety within

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the abdominal cavity; but, if it extend over the whole of the strangulated part, the surgeon should make sure that it is still living, by waiting a short time to see whether the discolouration becomes less intense, or by pressing the blood out of the distended veins and noting whether they become filled again. If he finds by these means that the vessels of the hernia are still capable of transmitting blood, it should be at once returned, but, should no signs of vitality show themselves after a reasonable time, the case must be treated as one of mortification.

When the intestine is returned the finger should be passed quite within the abdomen, to ascertain that no portion of the gut is engaged within the sac.

When gangrene is fully established the dead portion of gut becomes of a grey or ash colour. It loses its glistening appearance, and its coats become soft and may easily be lacerated.

When the gangrene is general, the ~~per~~ bowel must be laid open throughout the whole length of the gangrenous part, which must be left in the sac to slough. The contents of the

upper bowel one usually freely discharged through this opening without division of the stricture, but if not, a director should be passed under it, and its division effected in the usual way. The wound must be left open to allow of the discharge of matter.

When the gangrene is partial, being limited to a few spots, the stricture should at once be divided and the bowel returned, as it is proved by researches that the adhesive process preceding the separation of the slough prevents the effusion of fæces.

If the bowel be perforated by a single aperture only and that aperture small, it may be closed by a fine ligature the ends of which are cut off short, and the bowel returned, as recommended by Sir A. Cooper. If the aperture is large however, this proceeding is inadmissible as the ligature would reduce the calibre of the bowel so as to cause obstruction to the passage of its contents.

In this case, the gangrenous part must be freely laid open and left in the sac, the stricture being divided or not as circumstances may require.

Adhesions of the intestines require different

treatment according to their situation and nature. If they are between the intestine and the body of the sac, or omentum, and are recent, they may be destroyed by the handle of the scalpel or the finger; but, if they are of long standing, and have become organized, unless they are of great extent, they should be carefully divided by the scalpel.

When they are of great extent it is improper to divide them at all. The bowel should be allowed to remain in the sac after the division of the stricture.

Adductions to the neck of the sac, if they are slight, may be divided by the knife, but if they are extensive, the stricture should simply be divided and the parts allowed to remain.

If there be any omentum contained in the sac, it should, after the stricture is divided, be drawn down to make sure that it is free from constriction.

If it be healthy and small in quantity, it should be returned, but if it be large in quantity, it should be cut off, even if perfectly healthy, and its removal is the more necessary if it be inflamed or gangrenous.

When the omentum is adherent but otherwise fit to be returned, the adhesion may be divided with the knife.

In performing the operation for strangulated hernia the intestine may be wounded - when this happens, the edges of the wound should be closed by a fine ligature with the ends cut off close, and the bowel returned into the abdomen. In small wounds a single stitch may be enough, but when the opening is large, the Glover's suture should be used.

Although such accidents are rare, important blood vessels have been wounded during the operation for strangulated hernia. When this occurs it is usually made very evident by a gush of blood; but there may be no external hæmorrhage, the blood being effused internally.

When any considerable artery has been wounded during the incision of the structure, an endeavour should be made to secure it by ligature; if this cannot be done, compression must be employed which has been known in some cases effectually to suppress copious hæmorrhage. After the operation, the patient should have no medical treatment for several hours, except a

an opiate, should be irritable and restless, or stimulants, should the operation be followed by much prostration and exhaustion.

Purgatives should not be given until forty-eight hours have elapsed, and then they should be of a very mild description.

Should inflammation within the abdomen supervene, as indicated by tenderness on pressure in the vicinity of the hernia or diffused over the abdomen, and ^{by} its other usual symptoms, bleeding, suited in extent to the state of the patient's constitution may be employed, with leeches to the abdomen, hot fomentations, poultices &c., and, in robust patients Calomel and Opium. When the inflammation is subsiding, a large blister may be applied over the abdominal surface.

Should the sac suppurate after the operation, the wound must be reopened and the cavity of the sac exposed to allow the discharge of matter, and Poultices be constantly applied.

A truss should always be worn after the healing of the external wound.

A new operation for the relief of strangulated hernia, when the protrusion is small and recent, has been proposed by Dr. Niven of Edinburgh

which he thus describes. - "An incision is to be made
 " in a vertical direction, about an inch or an inch
 " and a half above the neck of the sac, dividing
 " the skin of the abdomen, and gradually diminishing
 " in extent till the peritoneum is reached.
 " The peritoneum is then to be opened to the extent
 " of admitting a blunt hook, or what is perhaps
 " better, a fine curved pair of forceps, with which
 " the neck of the protruded intestine is to be grasped
 " and gently drawn upwards, whilst the taxis is
 " applied from the outside to assist. The wound is
 " then to be closed with a hare-lip pin or wire su-
 " ture."

This operation would appear to be only applicable in
 cases where adhesions do not exist, and where the
 constricted portion of intestine is in a perfectly
 healthy condition.

When stranguation exists at the neck of the sac, the
 hernia is sometimes reduced along with the sac,
 the intestine being still strangulated. This accident
 is called by the French réduction en bloc, and
 by us reduction in mass.

It may occur under different circumstances;
 in the greater number of recorded cases, the hernia
 was reduced in mass by the patients themselves,

in some, by the surgeon while performing the taxis, and in a very few it has occurred during the operation for strangulated hernia.

Arnaud, in describing the signs of hernia reduced in mass, says - "the tumour returns all at once, "as it were, in a lump, the surgeon being neither sensible of that successive and gradual diminution in size which is usually observed in the perfect reduction, nor of the rumbling or gurgling noise which generally attends an enterocele when released from strangulation."

If, along with these signs, the symptoms of strangulation still continue, after reduction, and a firm tumour is felt within the abdomen near the ring painful to the touch, the presumption is strong that the accident has occurred.

To make sure, it is recommended that an exploratory incision be made exposing the ring, and laying open the filamentous tissue in which the sac is, or was, lodged.

If an empty sac be found, the hernia has not been reduced in mass, but, if there is no sac it becomes evident that it had.

In the latter case, the strangulated parts must be caused to descend by enlarging the ring by incision if necessary.

The sac should then be opened, the constriction divided, and the treatment afterwards conducted on the same principles as those already enumerated for the ordinary operation for strangulated hernia.

Inguinal hernia

is so called when the protruded viscera pass through one or both abdominal rings, or directly into the inguinal canal.

Of this kind of hernia there are three varieties, - Oblique inguinal - hernia of the tunica vaginalis - and direct inguinal.

When the protrusion does not descend further than the groin the disease is called Bubo nocele :

When it descends into the Scrotum, Oscrocele. Oblique inguinal, which is by far the most common form of hernia in the male, is a protrusion of the abdominal viscera into the sheath of the spermatic vessels through the inguinal canal.

Its coverings, from the surface to the intestine,

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are - integument, superficial fascia, fascia proper, fibres of the cremaster muscle, transversalis fascia, and lastly peritoneum which constitutes the sac.

Oblique Inguinal hernia appears first as a slight projection at the internal abdominal ring, through which it passes, pushing before it the peritoneum into the sheath of the spermatic vessels.

As the protrusion advances, ^{it becomes elongated} and fills up the inguinal canal, and, if not interfered with, projects through the internal abdominal ring, and descends along the spermatic cord into the Scrotum.

Oblique Inguinal hernia is liable to be confounded with other tumours, not of a hernial character. It is also sometimes very difficult to distinguish between this variety and hernia of the tunica vaginalis, but fortunately this is of very little importance, the relationship of the protruded viscera being the same in both; the only difference in the varieties being, that in the one the sac is formed by peritoneum, and in the other by Tunica vaginalis.

Oblique Inguinal hernia may also be confounded with the direct variety, even when the operation for strangulation is being performed, and, as in this case, it is impossible to say on which side of the neck of the sac the epigastric artery lies, the structure should always be divided upwards, as recommended by Sir Astley Cooper.

Oblique Inguinal hernia may ^{also} be confounded with hydrocele of the spermatic cord, but the latter may be distinguished by its size not being diminished by pressure or position; by its always showing a great amount of tension; and by the cord being of its normal thickness above and below the swelling.

In hydrocele of the tunica vaginalis, the tumour commences below, extending upwards, which is the reverse of what takes place in hernia. It is unaffected by pressure or position, and is never tympanitic. It is also generally translucent, while hernia is generally opaque. Varicocele, like hernia, is affected by pressure and position, and becomes enlarged during the act of coughing or other muscular exertion. It might therefore be mistaken for

hernia, but a careful examination will suffice to detect the difference; the peculiar feeling of the distended veins rolling earth-worms between the fingers being unlike that of any other tumour.

Varicocele occurs most frequently on the left side, inguinal hernia on the right.

Adipose tumour of the cord can hardly be mistaken for hernia, from the absence of all symptoms except swelling.

Bubo has been taken for hernia, and vice versa, but the history and local characters of the case ought to lead to a ~~the~~ correct diagnosis.

A Testicle retained within the inguinal canal will simulate hernia, but may be known by the absence of the testicle in that side of the scrotum, and by the peculiar sensation when the tumour is pressed.

Psoas abscess might be taken for hernia, but a careful examination of its local character and general history ought to determine its nature.

The treatment of oblique inguinal hernia, when reducible, is palliative or radical.

The first, as stated when speaking of the treatment of reducible hernia, generally, comprehends the return of the protruded parts within the abdominal cavity, and their retention there by means of trusses already described.

When oblique inguinal hernia becomes strangulated and when it cannot be reduced by the employment of the taxis and its auxiliaries, the knife must be resorted to for its relief. An incision of about two inches in length is made over the tumour in the direction of the inguinal canal, and the different layers of coverings carefully dissected, till the spermatic sheath is exposed.

Should it then be determined not to ~~xxx~~ open the sac, a director is introduced behind the edge of the internal oblique and transversalis muscles, and the constriction divided by the hernia knife.

The contents of the sac are then to be returned by gentle pressure within the abdomen.

If, from the condition of the parts external to the sac not constituting the structure, or from any other cause, it be determined to open the

sac, the spermatic sheath is then divided, next the subserous tissue, and lastly the sac itself, to the upper part of which the finger or a director is passed and the stricture relieved by the hernia knife, which should always be directed upwards parallel to the linea alba to avoid the epigastric artery. The protruded parts are then treated as before described.

The operations, with or without opening the sac, when the hernia is scrotal are conducted on the same principles, the external incision being made longer and extending downwards over the most prominent parts of the tumour.

In hernia of the Tunica vaginalis, (sometimes called congenital hernia, although it does not occur till after birth) the protrusion takes place into the tunica vaginalis which constitutes the sac, instead of the peritoneum & as in other kinds of hernia.

Adhesions sometimes form in the abdomen between the gut and the testicle, preventing the descent of the latter. If they do not prevent its descent, it drags the viscera down

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with it, and the hernia is irreducible, in which case the treatment is the same as in any other form of irreducible hernia.

In reducible congenital hernia, an accurately fitting truss should be applied when the child is a few weeks old, and a radical cure, by this means may very frequently be looked for within a year.

There is another form of this variety of hernia called by Mr Hey hernia infantilis, in which the protrusion takes place behind the testicle. It is of very rare occurrence.

In direct inguinal hernia the protrusion takes place through the abdominal walls, most usually opposite the external ring.

The treatment of this variety differs little from that of the oblique.

In performing the taxis, the pressure is made directly upwards, and in operating when it has become strangulated the same rules apply as in the other, with the exception that there is no covering of the cremaster muscle to divide.

The incision for the relief of the stricture should be made parallel to the linea alba, the

epigastric artery lying on the iliac side of the tumour.

Femoral hernia is a protrusion of the viscera into the sheath of the femoral vessels.

The Ileum is the viscus most frequently protruded, and it is generally accompanied with omentum.

The omentum alone is seldom found in Femoral hernia.

From the greater size of the femoral arch, as already stated, this form of the disease is more frequent in females than in males.

Its coverings are; integument, superficial fascia, cribriform fascia, fascia proper, septum crurale, and the peritoneum containing the sac.

Femoral hernia may exist in the reducible, irreducible, or the strangulated condition.

The two first do not require any further observations than those which have been made when describing those conditions in hernia generally.

When strangulated, however, there are some differences in the treatment which it is important to notice.

When femoral hernia occurs, the protrusion takes place through the femoral ring into the upper part of the sheath of the femoral vessels. If the pressure which gave rise to the protrusion is continued the intestine is next forced forwards through the saphenous opening of the fascia lata, and afterwards upwards over Poupart's ligament. The direction of its descent then, being downwards, forwards, and upwards, it is necessary, in using the taxis, to apply the pressure in the reverse order. The constriction in femoral hernia may be caused by the femoral arch, by the sheath of the femoral vessels, by the neck of the sac, or by membranous bands or adhesions within it. The sheath of the vessels is the part however which most frequently constitutes the stricture.

The treatment of femoral hernia, in a reducible state, consists, as in the other kinds of the disease, in the return of the protrusion within the abdominal cavity, and its retention there by means of trusses. When irreducible it must be treated in the same way as the other varieties of the disease in the same state, viz: by rest, recumbency and pressure by means of a truss with a hollow pad.

Strangulation occurs more frequently in this, than in inguinal hernia, and proves more rapidly

destructive.

Having failed in returning the protrusion by the taxis, no time should be lost in proceeding to operate.

An incision is first made parallel to Poupart's ligament, by transfixing a fold of skin, and then upwards, at right angles, from the middle of the first.

The different layers are then carefully divided, till the sheath of the femoral vessels is exposed. This presents an appearance very much like the sac itself and may be mistaken for it. The sheath should then be opened ~~on~~ a director introduced, and its further division effected vertically. The subserous tissue of the sac is then divided and the sac itself exposed.

If it be resolved not to open the sac, a director is introduced upwards between it and the sheath, and the upper part of the sheath divided by the hernia knife as far as the edge of the femoral arch. In many cases this will be sufficient for the relief of the stricture, but if not, the knife must be carried on the director still further up, till the resistance is passed. The stricture is then divided.

If, after the division of the parts external to the sac, the viscera cannot be returned, the sac itself must be opened carefully, the finger or a director passed to its upper part, behind the stricture, which is to be divided

upwards, the knife inclining somewhat towards the umbilicus. The division of the stricture need be made to a very moderate extent; injury to the spermatic vessels is thereby prevented, and by directing the incision upwards instead of towards the funicles, there is less risk of wounding the oblique artery when it runs out of its usual course. If profuse hemorrhage takes place, which cannot be controlled by pressure, showing that an important vessel has been divided, the sac may be drawn down and the artery brought into view. If this fail, the incision in the abdominal wall must be enlarged, and the extremities of the wounded vessel exposed and secured. In the after treatment the same rules apply as in the other varieties of hernia.

Umbilical hernia, or Omphalocele, is a protrusion of the abdominal viscera through the umbilical ring. It occurs most frequently in infants, the viscera being pushed through the ring before it has become fully contracted. It was supposed that, in this form of hernia, when occurring in the adult, ~~the~~ the intestine was protruded through some part of the linea alba and not through the Umbilical ring itself, but Sir A. Cooper has found that in most cases it does take place through the ring. The coverings are skin, fascia and the peritoneal sac which contains almost always small intestine,

and very seldom omentum in infants. In adults omentum is generally found in the sac.

The Treatment, when reducible, is, as usual, palliative and radical; the first consists, in the infant, of the reduction of the tumour and the application of a conical pad, retained in its place by a bandage, or by strips of adhesive plaster. If this be constantly worn and fit accurately, there is a good prospect of a radical cure resulting.

In the adult the palliative treatment consists of wearing a compress and bandage or a truss, from which however no radical cure is to be ~~expected~~ expected. Mr. Barwell has been for some time in the habit of performing an operation for the radical cure of umbilical hernia which seems to be very simple and to have proved very successful. He describes it thus "The hernia having been returned, an assistant holds his finger over the opening. The skin of the navel and surrounding parts being pinched into a transverse fold a bistoury is thrust through so as to make a longitudinal incision over, or even ~~into~~ into, the sac, which is then freely opened, the tough remains of the umbilical vein turned upwards, and the ring exposed. If there be any difficulty in keeping the bowel back and yet allowing sufficient room for the further steps, the spoon of an ordinary ground director, passed through the navel, and held against the inner part of the opening, i.e. the inside of the belly, will stop the hole internally. Two or three

[Please to turn over two pages - there has been a mistake in putting the sheets together.]

" silver sutures are then placed across the gap, the precaution
 " to seize each edge with the forceps and turn it forward
 " so as absolutely to see that the point of the needle is safely
 " beyond all chance of wounding the bowel. When the sutures
 " are all placed, but not fastened, the director is withdrawn,
 " the wires twisted, and the opening seen to be satisfactorily
 " closed. The external wound should be also secured with silver
 " sutures. " Mr. Barnwell states that this operation may be
 performed at any age, and, in his hands has proved
 so successful and so perfectly free from any severe effects
 that he unhesitatingly recommends its adoption.

Umbilical hernia in adults has a great tendency to become
 irreducible and inflamed. The treatment of irreducible
 and inflamed irreducible hernia consists in the use of
 local and general blood letting, aperient enemata, ~~for~~
 fomentations to the part &c. &c. If relief is not obtained
 by these means, it may be presumed that strangulation has
 taken place, and an operation should immediately be
 performed for its relief. The operation is conducted in the
 usual way. If possible the sac should not be opened
 as this proceeding adds greatly to the already existing
 danger. Fortunately it seldom requires to be, as the
 stricture is generally external to the sac.

When a protrusion of viscera takes place, not through the
 abdominal, femoral, or umbilical rings, but through
 the abdominal walls, it is termed ventral.

ventral
hernia

causes

This form of hernia is found most frequently in the upper half of the linea alba, but it may occur in any part of the abdominal walls. The causes of ventral hernia are, congenital defect in the development of the abdominal muscles and tendons, blows, pregnancy and wounds. The Caesarean operation has been followed by it.

When reducible, ventral hernia may be retained in its place ~~and~~ by a truss with a conical pad.

The operation for the strangulated condition of the disease has seldom been performed, and in most of the recorded cases the result has been fatal.

perineal
hernia

Perineal hernia is a protrusion ^{occurring} at the lower aperture of the pelvis, the viscera descending ^{between} the rectum and bladder, in the male, and between the rectum and vagina in the female.

This form of protrusion is rare. When it does take place the treatment consists in wearing bandages or trusses. When the tumour bulges into the vagina, instead of into the perineum, it is called vaginal hernia, for the treatment of which a peculiar truss is required.

Obturator, Ischiatic, and Diaphragmatic herniae, names given to those protrusions which take place through the Obturator foramen, Ischiatic notch, and Diaphragm, have been seen in the dead body, but cannot be diagnosed during life.