PUNCTURE BIOPSY OF THE LIVER

SHEILA SHERLOCK, M.D. (Edin.), M.R.C.P.

Department of Medicine, Postgraduate Medical School of London, England

In the study of a patient with liver disease, in spite of careful clinical observation and laboratory investigation, the diagnosis may still remain in doubt. Examination of sections of liver tissue may then prove to be invaluable. A liver biopsy may be obtained by open operation or by a needle-puncture procedure. Although this latter method was apparently performed as long ago as 1883 by no less a person than Paul Ehrlich (von Frerichs, 1884) it has not come into general use until recently. This has been due to the undoubted risks involved. It is only in recent years, with improvements in the care of the patient and in the technique, that puncture biopsy of the liver has become widely used.

Techniques

In all the methods employed a small cylinder of liver is removed by means of a needle, and is then fixed, imbedded in paraffin and sectioned by the usual histological techniques. It must be emphasized that the result is an actual tissue section containing 10-20 hepatic lobules. It is not a smear of liver cells.

Site of Puncture. The liver may be approached from above or below the diaphragm. The subcostal technique is confined to cases in which the liver is enlarged to a hand’s breadth below the costal margin.

The intercostal method has the advantage of providing the whole transverse depth of the right lobe for puncture and of avoiding intrabdominal hollow viscera. It does, however, necessitate penetration of the pleural cavity, but it is the more satisfactory routine procedure and is therefore described in greater detail.

The patient lies supine in bed. The site selected in the line is anaesthetized with 2 per cent procaine solution. The infiltrating needle is carried right down to and through the capsule of the liver. The specially designed cannula is 15 centimetres long and 1.5 millimetres in diameter, and is fitted with a handled trocar. The instrument is passed through the skin and the patient is then instructed to hold his breath in expiration. The trocar and cannula are then passed through the diaphragm and into the liver. The trocar is not withdrawn until the instrument is fully 1.5 centimetres within the liver substance. The cylinder of liver tissue is then punched out by advancing the cannula a further 4-5 centimetres into the liver. A syringe is attached to the cannula, and suction is applied and maintained while the cannula is being withdrawn. The fragment of liver
is fixed in formol saline solution. If glycogen stains are desired, absolute alcohol should be the fixative.

In the subcostal technique a trocar and cannula are inserted just below and to the right of the xiphoid process (Gillman and Gillman, 1945) or in the mid-clavicular line (Tripoli and Fader, 1941). The actual manoeuvres are similar to those described for the intercostal procedure. Peritoneoscopy is sometimes combined with the subcostal technique, so that the liver surface can be visualized and the site of puncture chosen (Hoffbauer, Evans and Watson, 1945). Peritoneoscopy, however, adds greatly to the magnitude and discomfort of the procedure.

**Failures.** Failure to obtain an adequate sample occurs particularly in patients with small hard cirrhotic livers. Ascites may make biopsy of the liver difficult and the abdomen should be tapped before puncture. The failure rate is approximately 2-3 per cent of biopsies. Failures diminish with an increasing diameter of the cannula; however, a cannula of more than 2 millimetres diameter is considered to be dangerous.

**Preparation and After-Care of Patients**

**Selection of Cases.** Liver biopsy should not be performed on patients with a haemorrhage tendency. Jaundiced patients should be given an appropriate preparation of vitamin K for 3 days before the puncture. In every instance the patient's blood group should be known, and compatible blood should be readily available for transfusion. The intercostal technique must not be used for patients who cannot co-operate in holding their breath or who have disease of the right pleural cavity.

**After-Care.** After the puncture the patient is given a sedative, usually morphine \( \frac{1}{4} - \frac{1}{6} \text{ grain} \), and is confined to bed for 24 hours. The patient is watched carefully and the pulse rate is taken hourly. Any sign of haemorrhage is an indication for administration of the available cross-matched blood.

**Complications.** Scrutiny of the literature shows that in approximately 3,158 puncture liver biopsies there have been 9 deaths directly attributed to the procedure. This gives a mortality rate of 0.29 per cent.

The great danger is from haemorrhage, which is usually intraperitoneal or, with the transpleural approach, may be intrathoracic. This complication should be recognized early; blood transfusion may be necessary. A hollow viscus may be penetrated. The colon has been perforated without untoward results (Baron, 1939). Penetration of the gall bladder may be more serious and usually necessitates surgical exploration of the abdomen. A small pneumo-thorax may follow the intercostal technique; this usually resolves without treatment. Unless a liver abscess is unfortunately ruptured, infection of the pleural or peritoneal cavities is most uncommon.

**Applications of Liver Biopsy**

**Differential diagnosis.** Puncture biopsy of the liver is most valuable in the diagnosis of hepatic disease. A timely biopsy often saves a patient
from an unnecessary surgical exploration. This is particularly so in jaundice. Liver biopsy enables icterus of hepatic parenchymal origin to be readily distinguished from surgical obstructive jaundice. Difficulty only arises early in the course of a bile-duct obstruction or in the recovery stages of acute infective hepatitis. Hepatic histological changes may then be minimal. Further observation of the patient with, if necessary, a second liver biopsy usually clarifies the diagnosis.

The aetiology of unexplained hepatomegaly is often solved by liver biopsy. In many instances normal hepatic histology is seen. This is particularly true of the enlarged liver following acute infective hepatitis. It is important that such a finding be distinguished from the true cirrhosis which occasionally follows hepatitis (Sherlock, 1948).

Diffuse liver lesions without jaundice, such as fatty liver, amyloidosis, haemochromatosis or glycogen disease, can be diagnosed by liver biopsy. Patchy liver lesions, such as primary or secondary tumour or abscess, are recognized only if the trocar chances to strike the diseased part.

The liver is part of the reticulo-endothelial system, and its involvement in blood dyscrasias enables liver biopsy to be used as confirmatory evidence in the diagnosis of Hodgkin’s disease or of the leukaemias.

**Evaluation of Therapy.** Liver biopsy is used in the evaluation of therapy. Using serial biopsies, Buck (1948) has shown the improvement that can occur in alcoholic cirrhotic subjects when put at rest, deprived of alcohol and given an adequate diet. Further work along these lines is needed to delineate accurately the best treatment for the various forms of liver disease.

**Research.** As a method of research, liver biopsy offers many possibilities. Chemical analysis of the liver-tissue sample (for example, for glycogen) can be used to assess the results of therapy and to obtain a better understanding of the underlying processes involved in liver disease. Comparison of the histological appearances of the liver with biochemical results provides one way of evaluating the various liver function tests, both those now in use and those which may be evolved in the future.

**Conclusions**

It is doubtful whether aspiration liver biopsy, a method involving the blind penetration of a vascular organ, can ever be completely safe. It should be undertaken only by those well trained in its execution and in an institution equipped for careful observation of the patient and for blood transfusion, if necessary. With these provisos it is a justified and helpful adjunct in clinical medicine.

**REFERENCES**

THE MANAGEMENT OF COMMON DIFFICULTIES IN OBSTETRICAL PRACTICE

D. M. Low, M.D., M.R.C.O.G.
Department of Obstetrics, University of Toronto

The aim of good obstetrical practice is to safeguard the health and strength of both mother and child. The life of an obstetrician is, at one and the same time, a most strenuous and satisfying one. The reduction in the maternal mortality rate to less than one half what it remained for many years prior to 1936 has been very gratifying and because of many factors. Amongst these factors, the universal trend to hospitalization of obstetrical patients, better obstetrical practice, improved anaesthesia, the advent of sulfonamides and antibiotics and the more liberal use of blood transfusion can be mentioned. Gratifying as this improvement has been, there is room for further reduction of maternal mortality and we in the profession must continue our efforts to this end.

Occiput Posterior

It would seem almost superfluous to speak of the difficulties encountered as a result of this position. However, while over 85% of such cases will usually occasion no undue difficulty other than somewhat prolonged labor and, indeed, may remain entirely unrecognized, there remains a percentage which may require assistance. When a diagnosis of occiput posterior occurs in an unengaged head, the problem must be decided on the basis of disproportion and not because of the posterior position. With the engaged head no interference is indicated as a rule, until lack of progress is noted in the second stage. If there is undue delay in the second stage, it will usually be due to lack of, or partial anterior rotation and our preference is to effect delivery in such cases by manual rotation with application and delivery by forceps. With mal rotation posteriorly to the occipito sacral, if the head is showing considerable moulding and at or past the level of the ischial spines delivery as occipito sacral with adequate episiotomy is often preferable to dislodgment upwards of the head and manual rotation.

This still leaves us the rare type of case where we have to consider breaking the cardinal rule of no forceps application until the cervix is fully dilated, because of the fact that pains are unsatisfactory and the cervix is resistant. It is in this type of case that we have to say to ourselves, can we wait a further 6 to 8 hours or should we interfere now? This decision rests mainly on assessment of the condition of mother and child. Sometimes such condition of one or both will require our interference even with a ring of cervix present. Fortunately even in such situations we often find that after manual rotation and application of forceps, the cervix, although not completely dilated, is dilatable and can be eased over the anterior rotated head without undue difficulty and no laceration. Even so, one should always say to oneself, could this be avoided with
further patience, should the condition of mother and child warrant more
time in labor?

Border Line Disproportion

One of the most common difficulties which confront us is the patient,
usually a primipara, who comes into labor with a presenting part not well
engaged, and showing what is often called a border line degree of dis­
proportion. The absolute type of disproportion is usually easy to recog­
nize, and in our experience does not usually require a test of labor. The
border line or relative type of disproportion is best treated by a test of
labor at term. We do not feel that induction of labor for relative dis­
proportion is advisable nor from such attempts at induction can a proper
test for or against vaginal delivery be made. The best test of labor occurs
after a spontaneous onset. With such onset, proper obstetrical judgment
as to mode of delivery is, in the main, arrived at by clinical observation
with regard to descent of the presenting part and behaviour of the cervix.
Care must be taken that during this test nothing should occur that will in
any way produce any deterioration of the patient as a surgical risk. Re­
assurance, proper fluid balance, no over sedation and no unnecessary
vaginal examinations must be the main criteria of proper care during the
test. X-ray visualization of pelvic inlet and lateral view of the pelvic
cavity and outlet may be of assistance and at times a careful vaginal exam­
ination under anaesthesia may be necessary. Under such conditions no
arbitrary time limit can be set except to say that, as a rule, with mem­
branes intact it should be possible within 36 hours to arrive at a proper
decision for or against the necessity of Caesarian section, with ruptured
membranes the decision should be arrived at within 24 hours. In spite of
such conduct and observation of a test labor, there will still remain the
type of case, usually giving evidence of primary inertia, that even yet will
lead us astray and in which, after having made a decision for vaginal
delivery, subsequent lack of progress might lead us to reverse our deci­
sion and require employment of extra peritoneal section. Such reversal
of decision should not often be necessary.

Breech Presentation

The management of Breech Presentation constitutes at times one of
the major difficulties of obstetrical practice. A Breech delivery may either
be very difficult or very easy. When discovered in the last trimester of
pregnancy the advisability of attempting to convert into a vertex by ex­
ternal version must be considered. Our practice is to accept the Breech
presentation unless external version is easily accomplished. Both com­
plete and incomplete Breech are treated by watchful expectancy, and as
long as progressive descent is occurring, no interference is needed except
the usual assisted Breech delivery, with the patient in the lithotomy posi­
tion and episiotomy performed as the Breech appears at the vaginal out­
let. A low spinal anaesthetic or cyclopropane combined with a small dose
of curare has been of help at the time of delivery in achieving relaxation
of vaginal outlet. I feel that the bringing down of extended legs in a Frank Breech should not be considered unless there is obvious delay and lack of descent or progress in the second stage. Even where such manipulation is necessary once the legs have been brought down, immediate delivery or Breech extraction should be effected. The anaesthetic should be stopped, pains allowed to return and in most cases assisted Breech delivery will occur within 20 or 30 minutes. I feel that the term and procedure "Breech extraction" should be restricted to the rare instance of the prolapsed cord where Breech extraction with the attendant haste and trauma is called for.

Consideration of Breech presentation in the primiparous patient over 35 years of age makes one feel that Caesarian section will often be the treatment of choice.

Antepartum Hemorrhage

It is still sometimes difficult to fully realize that when a patient near term reports vaginal bleeding, that is obviously more than show or blood stained amniotic fluid, that patient is likely having such symptoms because of either placenta praevia or accidental hemorrhage. It is imperative that such a patient be hospitalized at once. Such early hospitalization is the first and most important step in treatment. There is no excuse here for delay in this regard. The old axiom still holds that if any hemorrhage occurs at or near term, the sooner that pregnancy is terminated the better.

It will be understood that, once hospitalized, treatment will be directed along four lines:

1. Stop the hemorrhage, if it is continuing.
2. Combat shock and blood loss.
3. Establish a diagnosis.
4. Decide on the method of terminating the pregnancy.

The differential diagnosis between placenta praevia and accidental hemorrhage is sometimes confusing but not usually difficult. Painless hemorrhage, imperfect engagement of the presenting part or palpable placenta on vaginal examination will usually suggest a diagnosis of placenta praevia in a patient where the tone of the uterus is normal, the foetal heart is audible and the degree of shock is proportionate to the amount of vaginal bleeding. On the other hand sudden pain in the lower abdomen with or without vaginal bleeding and the finding of a tense, tender uterus with as a rule engagement of the presenting part but absence of palpable placenta on vaginal examination will usually suggest a diagnosis of accidental hemorrhage.

In either event once proper supporting treatment has been provided, examination under anaesthesia should be made in the operating room where all preparations should have been made for vaginal delivery or Caesarian section if so decided. At the time of this examination it should be possible to establish the diagnosis of accidental hemorrhage or placenta praevia.
If accidental hemorrhage is the diagnosis, treatment in most cases will consist of rupture of the membranes, continuance of intravenous therapy if necessary, proper sedation and delivery with forceps early in the second stage. In a few rare acute fulminating cases with no sign of uterine contractions and no effacement or dilatation of the cervix it may be necessary to perform Caesarian section or Caesarian hysterectomy.

With a diagnosis of placenta praevia the most important factor in deciding upon treatment, is the engagement or non-engagement of the presenting part indicating either incomplete or complete degree of praevia. With the presenting part well engaged it is almost certain that with rupture of membranes, labor pains will enable the presenting part to act as an efficient pressure hemostat and prevent further hemorrhage. Without such engagement it must be assumed there is a more complete degree of placenta praevia requiring employment of Caesarian section.

X-Ray visualization of placenta may be of assistance in diagnosis where the amount of bleeding has not been severe or continued. This is particularly so when bleeding has arisen early before certain age of viability of the foetus. If in such a case the placenta is clearly shown in the upper segment one will feel much happier about allowing the pregnancy to continue until more likely age of viability is assured. If, however, there is doubtful situation of placenta in the upper segment, continuation of the pregnancy should not be considered unless the patient remains in hospital.

It is thus apparent that if further reduction in maternal mortality from antepartum hemorrhage is to ensue the remedy lies within ourselves. We must insist on immediate hospitalization, adequate blood transfusion, and prompt treatment once a diagnosis is established.

Post Partum Hemorrhage

Hemorrhage following delivery of the child, either before or after the expulsion of the placenta still remains an appreciable factor in maternal mortality. Avoidance of predisposing factors which may favour the occurrence of post partum hemorrhage can sometimes be made. Proper conduct of labor with adequate but no over sedation, proper degree and type of anaesthesia, routine catheterization of bladder, and administration of oxytoxics as the child is born, combined with slow, deliberate delivery of the child as advocated by Dieckman will in most instances obviate undue blood loss. Over-distension of the uterus because of multiple pregnancy or hydromnios will occasion caution and where incomplete placenta praevia has been present one will be alert for possible bleeding. Our practice for usual delivery is to use cyclopropane which we believe expedites the normal separation of placenta from the increased tone of the uterus and with the addition of Pitocin or Ergometrine as the child is born, there is usually a minimum of blood loss and complete separation and expulsion of placenta and membrane. During
this interval it is our practice to carry out any necessary perineal repair. If any unusual bleeding, apart from lacerations, occurs during the third stage we believe in immediate removal of placenta manually. Careful inspection of placenta and membranes is routine. We only explore the uterus for obvious placental tissue but not for membranes. Here again blood transfusion is resorted to if blood loss has been excessive and with all patients previously typed a quick supply of blood is assured.

**Prenatal Blood Examination**

The problems of antepartum and postpartum hemorrhage bring into focus the necessity for adequate prenatal blood examinations. For the past two and a half years, we have established in Toronto a joint program among nine large hospitals of a prenatal blood examination service for both public and private patients whereby every obstetrical patient at about the fourth month of pregnancy has a blood sample taken for Hb estimation, Wasserman, Blood group and RH factor determination. This service is given free of charge for ward patients by the hospital blood bank at which the patient is to be confined. When the patient is admitted this data is already attached to her prenatal record sheet.

For the private patient each obstetrician fills out a form with pertinent details requesting such examination and on certain days allotted to that obstetrician his patients are instructed to appear at the blood bank of the hospital to which they are going to be admitted and have a sample of blood taken. A report is sent to the obstetrician, a copy is kept in the blood bank and will be attached to the patient's chart on admission and eventually a card will be supplied to the patient for her permanent possession. On this card, which she is instructed to carry as she would a registration card, is recorded her blood group, and RH factor. For this examination each hospital blood bank collects a fee of four dollars, of which one dollar is remitted by each hospital to the central RH serology laboratory situated in the Hospital for Sick Children. This gives adequate financial support to maintain the necessary technical service of the central RH laboratory where any further detailed examinations of RH negative mothers and of infants suffering from hemolytic disease of the newborn is carried out. There is no further charge for such examinations as are necessary. Such prenatal blood examination service has vastly improved our blood transfusion service and as a consequence should help in further reduction of both foetal and maternal mortality.

**Constitutional Diseases and Pregnancy**

I would like very briefly to discuss the difficulties encountered because of the association of constitutional disease and pregnancy. I will only touch on three such conditions, namely, Rheumatic Heart Disease, Diabetes, and Pulmonary Tuberculosis.

**Rheumatic Heart Disease**

The obstetrician in the care of the obstetrical patient suffering from
rheumatic heart disease will either require the co-operation of a cardiologist in the supervision of the pregnancy or must of himself possess the necessary knowledge to provide such supervision. During the prenatal period the patient must not be allowed to develop signs of circulatory failure. It must be understood that the period of greatest strain is usually evident in the seventh and eighth months, at which time special cardiac care must be taken. When the patient goes into labor, unless other obstetrical difficulty is found, cardiac cases are usually allowed assisted vaginal delivery. During labor she should have adequate sedation, ample reassurance, skilled anaesthesia and delivery with forceps to abolish the expulsive efforts of the second stage. Management as above appears to indicate that these patients stand the strain of labor, as well as, if not better, than delivery by Caesarian section.

**Diabetes**

It is quite apparent that since the advent of insulin a quarter of a century ago, the diabetic population has shown tremendous increase. There are now appearing as obstetrical patients many juvenile diabetics who without insulin would not have survived to adult life. These patients during pregnancy require close supervision and control of the diabetes. The foetal mortality, in diabetic patients, from death-in-utero has been appalling. Mainly for this reason it is our present opinion that for multipara especially and for primipara where the cervix is "ripe" induction of labor by rupture of membranes at the thirty-seventh week is advisable. Where the cervix is not ripe at the thirty-seventh week it is felt that Caesarian section is to be elected.

**Pulmonary Tuberculosis**

The present day attitude to this complication of pregnancy is not to interfere with the pregnancy, but to impose a sanitarium regime. Without other obstetrical indication, vaginal delivery with forceps is preferred and skilled anaesthesia is essential. The type of anaesthesia preferred is usually cyclopropane or low spinal.

In such constitutional diseases accompanying pregnancies as have been mentioned, the size of family such patients should be permitted is a point worthy of consideration by internist and obstetrician. For this reason sterilization of such patients must be considered in relation to economic status, which it would appear, is the main factor leading to undue work effort and fatigue where sufficient domestic help is not possible. It frequently is the case that patients suffering from constitutional disease handicap may withstand the strain of pregnancy and labor but the lack of assistance in household duties may well impose such degree of strain on the health and strength of the patient that her life expectancy is definitely reduced. Some consideration must be given to the work factor necessitated in caring for the family needs following delivery. Such work factor is conditioned by the size of the family.
Anoxaemia of New Born

The importance of avoiding anoxemia in the infant during labor or delivery has long been recognized from such causes as prolapsed cord or long delay in the second stage. Barcroft has shown that even a 10-minute moderate degree of anoxaemia may cause irreparable damage even though the child survives.

Even after delivery where anoxaemia is evident there is too often delay or neglect in the proper use of the mucous tube with the child held head down. The cord should not be clamped until this is done. Once this simple procedure has been satisfactorily accomplished and there is still delay in respiration, the infant should be gently placed in a warm bath (T. 108) or a warm blanket and immediate intubation performed through a laryngoscope with a laryngeal catheter (#12 De Lee) gum elastic. This will enable suction to be applied and the plug of mucous or aspirated material removed from the trachea or bronchus followed by installation of Oxygen through the catheter so as gently to distend the alveoli of the lung and thus set up the Herring-Breur reflex of respiration and prompt relief of the anoxaemia.

In conclusion, I have merely attempted to discuss a few of the more common difficulties encountered in obstetrical practice and to outline briefly avenues of treatment which are likely to assist in solving such problems and thus help in reducing maternal and foetal mortality to a minimum.
PSYCHOSURGERY — PRESENT STATUS

H M. BARKER, '50

That Psychosurgery is of more than passing interest is shown by the fact that over 100 articles on various aspects of the subject appeared in the literature of 1948. As one of the more dramatic and daring attacks on mental illness it justly deserves such consideration.

Psychosurgery, according to Freeman, consists of operations on the brain for the relief of mental disorders and pain. It cannot be considered as directed toward the etiological agent, since as regards mental diseases, the physiological and chemical disturbances which underly them are yet unknown. Psychosurgery has not had a course of easy acceptance, and even yet there are opponents. However, year by year, there has developed a wider acceptance of the procedures on the part of an increasing number of scientists. Agreement of opinion as to the value of the procedure has not yet been reached.

History

The earliest Psychosurgery is accredited to G. Burckhardt, superintendent of a mental hospital in Switzerland, who, in 1890, operated on six psychotic patients. He emphasized that his purpose was not so much to cure the patient as to change him from a dangerous sick person to a harmless one. The operation consisted of removal of cortex in several stages—similar to our present day topectomy.

In 1935 Fulton and Jacobson reported that prefrontal lobectomized monkeys did not evidence tension, anxiety, or neurotic behaviour when they made errors in their test performances. Egaz Maniz, stimulated by this report, suggested an operation to Neurosurgeon Lima, which would sever fibre pathways to the frontal cortex.

In 1936 Freeman and Watts introduced the operation in America. Lobotomy has been practised in many centres in the world, but new operations have been devised to increase the percentage of good results. Many theories of frontal lobe function have been erected and tested against the findings in various groups of patients, and the First International Conference on Psychosurgery was held in Lisbon in August 1948.

Procedures

It was suggested at the above conference that lobotomy be the generic name for all Psychosurgical operations. The terminology of subdivisions should be descriptive of location and structure sectioned. There are now several procedures in use, indicating that a diversified approach is being developed. Little uniformity exists among different operators as to total amount of white matter cut, or grey matter destroyed, or as to exact site where destruction is imposed. Standardization of operative procedure has not been reached.

Of the Leukotomy procedures, the bilateral prefrontal is best known. "Open" and "closed" techniques are used, but with the exception of
Freeman and Watts, the larger clinics are using the “open” method, where the white fibres of the brain are separated under direct vision. This may also be done unilaterally. As well, there are bilateral orbital, and transorbital approaches.

Lobectomy has been done in a small series of cases. The anterior portions of both frontal lobes are excised and removed permanently from the intracranial cavity.

Lately there have been more selective operations developed in order to prevent a blunting of the personality in realms of social sensitivity, conscience, imagination and foresight. Bilateral topectomy is one of these, and is a small, precise, surgical lesion by which the cortex is excised to the depth of grey matter only. Another is thalamotomy, where a lesion is created in the dorsomedian thalamic nucleus.

**Anatomic Considerations Theories and Rationale**

Some feel that this aspect of Psychosurgery is still very theoretical. Only a few of the principal ideas now advanced are considered here. Among these is the suggestion that the frontal area white matter has long been considered mainly an association area. There are also well defined projection tracts which give connection with subcortical centres such as the thalamus, nuclei of cranial nerves and spinal cord. These projection fibres are of two types, (1) Corticipetal, (2) Corticofugal. Many are directed to the thalamus. It is with these fibres, the thalamus and the hypothalamus, that we are particularly concerned.

The hypothalamus is the chief subcortical centre for the regulation of autonomic activities in the sympathetic and parasympathetic divisions.

The thalami are paired structures separated by the third ventricle. They possess several groups of nuclei. The medial group and specifically, the dorsal median nucleus of this group, which is well developed in man, is most important for our purpose. It has afferents from other thalamic nuclei, from the hypothalamus and lower sensory centres. Its efferents are to hypothalamus, corpus striatum and again significantly, to the frontal cortex. Other thalamic nuclei are the points on which converge many sensory tracts including vision, hearing, and pain. These sensations are relayed, after a certain amount of integration, to the appropriate area of cortex.

Freeman believes the dorsal median nucleus to be the anatomic substrate for emotional experience. Le Gros Clarke notes that the frontal cortex may be an important afferent projection area similar to visual and auditory cortex, and it has been shown that the dorsal median nucleus projects to definite areas of frontal lobe. These lobes and hypothalamus are intimately related in a two-way connection, mainly via the key relay station of the dorsal median nucleus. The constant finding in Pathological specimens is of degeneration of this nucleus and of the afferent and efferents between frontal lobe and thalamus. This gives us one rationale
for personality change following leukotomy.

Freeman and Watts feel that the frontal lobes are concerned with foresight, insight, and consciousness of self. The emotional component associated with these functions is supplied by thalamus. Sever the connections and we break the vicious circle of pre-occupations, emotional tension and imagination. We have, as a result, an individual less sensitive, less readily disturbed by remarks and deeds which would formerly have been considered abuses.

Selection of Cases

A.—Selection of Patients

General

Psychosurgery is a procedure of last resort on patients who have no longer a reasonable hope of spontaneous recovery, to be done only after conservative methods have failed, and while the patient is still fighting his disease and there is emotional tension present. A good prepsychotic personality adjustment with sudden onset of illness makes for a better outcome, as does a tendency to remit, and indications are favorable if a patient shows a temporary response to electro-convulsive therapy. As well, some believe that operation performed in the first two years of illness leads to a higher percentage of good results.

Specific

We have four large groups who have benefited:

1. Affective Psychosis: Involutional Depression and AgitatedDepressions

E. C. T. is most effective here, and operation not often recommended unless due to severe hypertension, auricular fibrillation, or previous failure of E. C. T.

2. Schizophrenias:

This is the largest, most difficult group. Insulin and E. C. T. are considered therapeutic prerequisites. The paranoid and catatonic types usually fare better than the simple and hebephrenic. There is a feeling that conservatism should be maintained, but that after 3 years of illness, the likelihood of spontaneous recovery is small indeed and the patient should receive surgery. It is difficult to decide when Schizophrenia becomes chronic. After 12-18 months of properly treated illness, the best psychiatric judgment should be utilized to consider desirability of leukotomy.

3. Obsessive Tension States

These patients often have intelligence, initiative, and ambition, and are good candidates in long standing cases.

4. Unbearable Pain

Due to carcinoma, tabes dorsalis, radiculitis, etc., the pain here is focus of attention—even when absent the patient seems waiting for it to strike. There has been much written on this approach to unbearable pain
but Freeman, an exponent of the operation, feels it should be considered in pain only when no other procedure seems to give much hope of success. Less favorable cases:

1. *Psychosis with organic disease.* Operation not done except in cases associated with chronic encephalitis.

2. *Epilepsy.* Operation may be considered on basis of mental symptoms without undue concern re convulsions.

3. Considered contra-indicated for constitutional psychopathology associated with cruelty, aggression, irresponsibility and anti social habits. Alcoholism is not improved and may be made worse.

B.—*Selection of Operation*

Major role in surgical treatment of mental disorders must be played by competent psychiatrists. The patient is not cured by lobectomy, and psychiatric guidance must continue. In a good number of cases this guidance need only be minimal, so great is the degree of recovery.

C.—*Selection of Family*

It is very important to have the confidence and support of the family when a patient leaves the hospital. Many who have been institutionalized for years cannot support themselves in a few weeks. Others are so improved they no longer need hospital care but are not self-supporting.

Follow up material on early cases has helped to refine selection but large clinics have rarely departed from use of operation as a last resort—doubtless because irreversible brain destruction is implicit in this treatment.

*Postoperative Course*

All patients do not follow the same pattern, and the following is a composite group of common findings. They are often completely disorientated as to time and environment, and confused as to actualities for just a few days, and little movement, interest or attention is evidenced. They sometimes must be retaught to eat as they either dawdle with food or eat too rapidly and if at home, often overeat.

Many continue to be physically sluggish and resist attempts to get them into activity. Procrastination is marked but they are more sociable, more articulate, with an improved physician-patient relationship. In judging this we must allow for euphoria with a carefree attitude, while a few may have outbursts of temper and distractability.

As to their psychotic manifestations, we find that hallucinations may not lessen but the response to them does. Obsessive thinking is less distracting, compulsive actions no longer occur, and ritualistic behavior ceases gradually. The emotional drive and affective accompaniment disappears. The number of paranoid ideas and their expression is lessened. One of the most noticeable results is their unselfconsciousness.
Intelligence, as measured by standard tests, shows little loss. There is a shift from the abstract to the concrete attitude, and also a reduction in ability to maintain attention to plan effectively.

Complications

1. **Incontinence of Urine**
   
   Incontinence occurs in most patients and is the main nursing problem. Dr. Soloman noted that there was a temporary 50% reduction in functional capacity of the bladder, which gives one physiological explanation for incontinence. Patients are readily retrained.

2. **Convulsions**
   
   The incidence varies from 3-12% but is more frequent after a second operation — if it is necessary. They may appear in immediate post-operative period but commonly in 9-15 months. The Grand Mal seizure is most common and these can be controlled with medication.

3. **Mortality**
   
   Up to 3%. Main causes in order are (1) Intracranial haemorrhage, (2) Meningitis, (3) Bronchopneumonia. The mortality is higher in "closed" than "open" operations.

Results

In discussing results from a variety of case series one must bear in mind certain factors which influence the statistics and make comparison difficult. There are the variations in age and social status of patients, and in the duration, severity, and manifestation of their disease. The previous therapy may have differed widely. The post-operative interval may be unspecified, and descriptive terms are used for the post-operative condition of the patient. As well, comparison with other therapies may not be justifiable because the operation is most often done when other therapies have failed.

1. **In Affective Psychosis**
   
   The more agitated of this group have a better prognosis. Approximately 75% make good functional recoveries. These people still have their peculiar compulsions and phobias, but are no longer dominated by them. Comparison with shock therapies and psychotherapy suggests that these two methods are equally effective therapeutically. This may be more apparent than real, since many lobotomy patients have had shock therapy previously without success.

2. **In Schizophrenia**
   
   Lobotomy in schizophrenia of short duration may produce a good result in 50% of cases, but in chronic deteriorated patients the operation is not so successful. In fact, in institutional cases there is a doubt if results are significantly better than may be expected from non-specific therapy. Even in cases of short duration it has not been proved that lobotomy is the superior treatment. However, in the Great Britain Board of Control series of one thousand cases, it was noted how favorable to
treatment, from a point of view of discharge, are the group whose disorder is under two years duration. Their figures were—for under two years 48% recovered, and over two years 20%.

3. In Obsessive Neuroses

Freeman notes good results in up to 68% of such cases, but we must remember that many of these patients were able to do some work before operation in spite of their neuroses, and that results from less drastic, though more time consuming therapies such as Psychoanalysis, are almost equally good.

4. The operation has not yet been widely used in non-psychotic patients, but results in these cases would indicate this procedure as a definitely useful tool in selected cases. Deterioration and relapses are rarely repeated. However, undesirable personality traits may be brought out following discharge which were not observable during the stay in the protected environment of the hospital.

Postoperative Rehabilitation

This work should begin as soon as possible post-operatively. In many ways it is not yet clear just what constitutes the best general psychotherapeutic and environmental approach. The period may be only a few months, or from three to five years, and therefore a long and short range program becomes a necessity. Early discharge to the family may be attempted only when the relatives are mature and with wholesome attitudes to the patient. E. C. T. and I. C. T. may be used even though no responses were obtained pre-operatively, and improvement may be aided.

It has been suggested that a well rounded full-time program flexible enough to meet individual needs is necessary. There needs to be persistent stimulation of interest in individual and group activities.

Some believe that patients tend to perpetuate their psychotic patterns when placed with the psychotic group post-operatively. Hence, the choice would be to expose them to normal living immediately after operation, preferably in a controlled environment designed for them, to simulate living as the patient will experience it outside the hospital. An alternative would be to assimilate them into a home if available, or again, to hold them in a regular mental hospital environment.

Those rehabilitated into society on a self-sustaining basis are approximately one-half the total. As part of rehabilitation, the establishment of the legal position of the lobotomy patient is not yet clear.

Criticisms of the Procedure

1. Undesirable side effects of convulsive seizures.
2. The unsatisfactory explanation of the pathology which the surgery is supposed to correct. The removed part is not vestigial nor is it excess tissue.
3. Psychosurgery is essentially a partial euthanasia.
4. A patient is reduced to a condition where judgment is seriously interfered with and what judgment he has cannot be used because the capacity for sustained initiative is largely lost.

5. Some feel that the shock therapies and psychotherapy are but a transient phase, and these advances, great as they have been, will be supplanted when complete knowledge of neuroanatomy and physiology is available.

**Summary**

1. Psychosurgery consists of operations on the brain for the relief of mental disorders and pain. It is not directed toward the etiologic agent but is a symptomatic treatment to be applied, at present at least, when other more conservative therapies have failed.

2. A number of operations have been devised, but standardization of operative procedure has not yet been reached.

3. Studies of pathological specimens would indicate that the main change is a degeneration in the dorsal median nucleus of the thalamus.

4. Selection of cases should utilize the best psychiatric judgment, and four large groups were differentiated.

5. The results of psychosurgery have been presented and compared with other therapies.

**Conclusions**

Psychosurgery results would indicate that in many ways it is as efficacious as some of our surgical approaches to other diseases. We must not suppose that it is the final answer and studies of the pre and post lobotomy personality in all its aspects is a field that is only now being fully appreciated in terms of psychology, psychiatry and physiology. It may not be long before we have studies from which we can derive a useful measure of what we are doing when we destroy function. Indications for and against leukotomy must be based not on a psychiatric classification of mental disorders, but on a study of the emotional and subjective self in relationship to the total personality. Even so, the operation must be considered only as a step in the reintegration of personality.

**BIBLIOGRAPHY**


Great Britain Board of Control: Prefrontal Leukotomy in 1000 cases. London: His Majesty’s Stationary Office, 1947.


ALLERGIC BRONCHIAL ASTHMA — ITS ETIOLOGY AND TREATMENT
C. R. ARNOLD, '50

ALLERGIC Bronchial Asthma is a loose term used to denote a syndrome characterized by paroxysmal shortness of breath, wheezing and cough. It is thought to be due to an underlying hypersensitivity or allergy to various excitants. Between attacks of asthma the patient is objectively and subjectively well.

General Considerations

The number of cases of bronchial asthma is unknown; however, the condition is widespread, occurring in practically every country in the world. It is estimated that in the United States 0.5% of the total population suffer the asthmatic syndrome. Mortality statistics of asthma are unreliable since many of them have been calculated to include other types of asthma than allergic bronchial—however, as a cause of death, bronchial asthma is relatively insignificant. Sex is of little importance in asthma although it is 50% to 80% commoner in males than females. Age is an important consideration—studies by Tufts show that in about 1/3 of cases asthma begins in the first decade of life, while another 50% begin between the ages of 10 and 40 years. The incidence then rapidly diminishes—no age, however, is exempt. It has also been found that the younger the patient when he is first seen by a doctor the better the prognosis. When asthma begins after the age of 40 years it is more difficult to relieve since it is more likely to be complicated by one of the degenerative diseases or by bacterial infections.

As a cause of bronchial asthma social status is unimportant, but as regards treatment and results of treatment the rich fare better, because they are able to secure proper facilities to rid themselves of the substances to which they are allergic.

As far as climate, altitude and environment in general is concerned, though it is of considerable importance, it is generally felt that these factors themselves do not cause asthma. Bronchial asthma is considered to be an hereditary illness which occurs only in predisposed individuals regardless of the above factors. Geographic, geologic and climatic factors are therefore considered as only secondary causes insofar as these lessen or increase exposure to allergens.

In discussing the causes of bronchial asthma three factors should be considered—first, the constitutional basis; second, the contributory factors; and third, the excitant causes.

A.—THE CONSTITUTIONAL BASIS — Heredity

It is generally believed that allergic people have a constitutional basis for their allergy or allergic symptoms. Just why this allergic condition exists is unknown but it appears that the tendency is transmitted
through chromosomes by heredity. In about 50% to 60% of all cases of asthma there is a history of one or more allergic conditions in other members of the family. It also appears that it is the allergic tendency which is forwarded, not the particular disease, and that the allergic condition which may develop depends on the amount, duration, and location of the exposure to the exciting allergens. The stronger the inheritance factor the earlier as a rule, will asthmatic symptoms manifest themselves. In instances where the mother and father are both allergic, more than 1/3 of the cases begin before the fifth year as contrasted to 15% where only one of the parents is allergic.

B.—CONTRIBUTORY FACTORS

The presence of a constitutional background leading to the development of an allergic tendency, plus exposure to exciting allergens, are important causes of attacks, but these may not suffice for the initiation of attacks—it may require contributory factors. These can be summarized as follows:

1. Mechanical factors—e.g. school room chalk, house dust.
2. Chemical factors—e.g. tobacco smoke—may often cause asthmatic attacks but specific allergy to smoke or tobacco is rare.
3. Physical factors—e.g. exposure to light, heat, cold and pressure. Duke has considered these as primary causes of asthma but Unger disagrees with him since the whole population is exposed to these factors and yet only susceptible individuals develop asthmatic attacks.
4. Infections—infected of all kinds have a definite relationship to asthma; some infections temporarily halt attacks while others may precipitate attacks. The common cold is the most important predisposing factor; however, unless there is a tendency to asthma, colds will not cause an attack. Bronchitis and sinusitis may also precipitate attacks but if fever is present for several days, an existing asthma may temporarily disappear.
5. Psychogenic factors—psychogenic factors have also been named as contributory causes since they frequently initiate or aggravate attacks. However, it has never been proved that true bronchial asthma is due solely to psychic factors. Unger does not believe asthma is of nervous origin because a sensitized person can be "cool as a cucumber" but if exposed to a specific allergen asthma may set in. Secondly, an infant of two or three months, healthy in every way, may develop asthma when ragweed pollen is in the air; if nervousness is a factor, why no symptoms till the air is full of pollen? Also many individuals have more or less been permanently relieved of their asthma by removing the antigen which brought on the attack—later these patients may have the same or similar nervous exposures yet asthma no longer occurs. One cannot explain such relief on psychic grounds. Asthma is, however, a frequent cause of nervousness. The difficulty in breathing may induce a great deal of apprehension and irritability. This nervousness disappears in whole or in great
part if the asthmatic attacks can be removed. In contrast to this, Hardie has recently reported in the Canadian Medical Association Journal considerable success in treating chronic asthmatics with psychotherapy. Most psychiatrists and allergists agree that psychoneurotic factors are important but not to the exclusion of the allergic background.

6. Endocrine factors—no endocrine factor or combination of factors has been definitely proven to be the cause of asthma; however, the various phases of life have a bearing on asthma. Puberty is often the time of onset of symptoms, or often symptoms disappear at this time. Also, asthmatic attacks are apt to be more severe one or two days before menstruation while the attacks subside with the onset of flow. Why this should occur is not known—the phenomenon is not seen in all female asthmatics. In many instances, asthmatics are almost free of attacks during pregnancy—in a few cases, symptoms are made worse by pregnancy. The menopause does not seem to affect asthma.

C.—EXCITING FACTORS

The constitutional factors and contributory influences, vital as they are, cannot bring on attacks unless there is also present one or more of the specific exciting causes, i.e. antigens. These are the substances which initiate the attacks in sensitized persons—without them symptoms do not occur. An allergic patient may be exposed to the substance to which he is sensitive and still not have symptoms. The dosage may be below that particular individual's threshold but a larger dosage may bring on an attack. In other words the quantity of the allergen to which the patient is exposed is important. Similarly the time element is also interesting. A patient may be exposed to the allergen for a considerable time before clinical symptoms appear. The time interval between the first exposure and the onset of symptoms varies with the allergen and the patient. Exposure must be present and adequate for symptoms to appear even in sensitized individuals. Allergens may be classified as follows:

1. Inhalants
   (a) pollen from trees, grasses and weeds
   (b) epidermal substances—hair, dander and feathers from various animals
   (c) moulds and yeasts
   (d) house dust
   (e) inhalant drugs—arsphenamin and cyclopropane
   (f) inhalant cereal and grain dust

2. Ingestants
   (a) cereals
   (b) eggs, milk and cheese
   (c) fish and meats
   (d) nuts and spices
   (e) fruits and vegetables
   (f) drugs—aspirin and quinine
3. **Injectants**

These cause symptoms on injection only, and as a whole are not very important in bronchial asthma.

(a) animal sera, e.g. tetanus and diphtheria antitoxin
(b) drugs—morphine and arsphenamin
(c) insect bites
(d) glandular products—insulin and liver extract

4. **Physical agents.**

The following is a brief discussion of the more important of the above allergens.

**Inhalants**—Inhalants are the most important exciting factors of bronchial asthma. These include pollens, animal dander, molds, and house dusts.

Only pollens which are wind borne are clinically important but other types of pollen can cause symptoms by close contact. The most important pollens are ragweed, sagebrush, June grass, timothy and red top grass, orchard grass, Bermuda grass, brome grass, silver maple, cottonwood, red oak, corn, Russian thistle, and Kochia. In order to cause asthma, Thommen has stated five postulates which a pollen must fulfill:

1. Pollen must contain an excitant for asthma.
2. Pollen must be wind borne.
3. Pollen must be produced in sufficiently large quantities.
4. Pollen must be sufficiently buoyant to be carried considerable distances.
5. The plant distributing the pollen must be widely and abundantly distributed.

Symptoms have been found to be directly proportional to the number of pollen granules in the air with one exception—asthma is usually worse on damp, stormy nights even though the pollen count is low at such times—just why this is so is unknown.

Animal dander and feathers are the most important of the animal substances. Skin reactions are usually quite specific for these. The "horse asthmatic" must be carefully watched when being given tetanus or diphtheria toxoids since a marked allergic reaction may occur on administration of these drugs. Included in this group of animal substances are cat hair, dog hair, rabbit hair, goat hair, sheep's wool and cattle hair.

In recent years studies of molds, yeasts, smuts and rusts have shown that these are almost as important as pollen and house dust as causes of inhalant symptoms. The allergenic fraction of molds lies in the spores—some of the more important molds are Alternaria, Hormodendrum, Cladosporium and Aspergilli—yeasts, smuts and rust are also important. Symptoms are again directly proportional to the mold spore count.

House dust is a very important cause of asthma. This is a grey powder which exudes from aging bedding and soft furniture but its exact nature is not known. There is disagreement as to whether it does, or does
not, contain a specific allergen but it has been proved allergenic by skin and transfer tests. Desensitization is indicated in all cases of allergy to house dust with good results.

Other miscellaneous inhalants include: cottonseed, Kapok seed, flaxseed, mustard, orris root, Indian gum, gum acacia, castor bean and coffee bean dust, and roots of various kinds.

Some of the main drugs which cause symptoms are lycopodium, podophyllin, quinine, Dover's powders, arsphenamines and ipecac.

*Ingestants*—Any food which contains protein is a possible excitant, though egg, wheat and milk are the most important. Chocolate, potato, fish, pork and the legumes have also been incriminated. While skin tests are accurate with eggs and wheat, they are often misleading with other foods. All tests must be clinically corroborated and food trials are necessary to find the offending food. Food allergies are more important in infancy and childhood but can cause symptoms at any age. Related foods should be avoided since one is often allergic to all members of a certain family of foods—e.g. all legumes.

Various drugs given by mouth have been shown to cause attacks of asthma. Among these aspirin is the most important and may cause very severe attacks of asthma in susceptible individuals. Likewise quinine has been shown to cause asthmatic attacks.

*Injectants*—The various injectants have been enumerated and will not be discussed further since they are not important causes of asthma attacks. However, they may cause many other types of allergic reactions.

*Physical agents* are important in allergy although their exact role, whether primary or secondary, is disputed. Bacterial infections and bacterial allergy also belong in the controversial group, some authors claiming that bacteria act as exciting allergens. Others deny this but concede the great importance of bacterial infection in asthma and the good results often obtained by the use of bacterial vaccines.

**TREATMENT**

The specific treatment of asthma consists of the elimination of the offending factor, or factors, and hyposensitization where this elimination cannot be carried out. It is obvious that the underlying constitutional basis cannot be changed. The combination of these two factors leads to complete relief from symptoms, or more or less improvement in the majority of patients; while non-specific measures, if they help at all, are usually only temporarily effective.

**A—Specific treatment**

1. *Elimination of allergens.* If there is no exposure to allergens there are no attacks of asthma—removal of the cause, if feasible, brings quick relief and as long as the cause is avoided no symptoms will occur. Complete elimination, therefore, is the ideal sought after and with co-operation of the patient it can often be obtained. The co-operation of the
patient must be obtained by careful examination. In order to find the specific allergen so that it may be eliminated three important methods are used, i.e. history, skin tests, and clinical trials. These will be discussed briefly.

The history in asthma is very important and must be taken with a great deal of care. It is generally considered best to allow the patient to tell his story first with no interruptions until the end. This is then supplemented with leading questions which the examiner considers important, so that a complete picture of the patient’s attacks and the intervals between is built up.

Skin tests offer the best method of investigation since often the history gives no clue. The clinical correlation of positive skin tests is most important. Positive reactions by themselves are suggestive but need confirmation. The most important tests are the cutaneous tests performed directly on the patient. These tests include the scratch tests and intracutaneous tests performed in the skin. Nasal and ophthalmic tests may also be used. Skin tests should be carried out for all foods which the patient eats and for all substances he might inhale. Incomplete testing is hazardous as it leads to incomplete diagnosis—important allergens may be missed. Positive skin tests should be clinically confirmed. A positive skin test according to Kern, Maytum and others merely means that the patient has been, is, or is potentially hypersensitive to the substance—it does not prove that the symptoms are caused by that particular allergen. Likewise a negative skin test does not necessarily prove the absence of sensitivity—an individual may be skin test negative yet clinically allergic—this is especially true in asthma. Generally scratch tests are first carried out and if sufficient information is not obtained, intradermal tests and passive transfer tests are then made.

Once the offending agent is found it must be completely eliminated. Food sensitive patients must not only avoid the offending food but all articles of diet which contain this food. Cooking reduces the antigenicity of all food and the less sensitive individual may be able to tolerate the offending food if it is well heated.

Those patients sensitive to inhalants are not so readily shielded. Those affected by pollens and molds can avoid them by moving to other regions during the seasons when the atmosphere is charged with pollen granules and mold spores. Some relief is obtained by closing the windows and by use of an air filter in the window or a filter which fits into the nostrils.

Animal dander can usually be easily avoided and elimination alone is successful in most cases. Those sensitive to house dust cannot be entirely protected by are aided by measures to reduce the amount of dust, e.g. the use of impervious casings for the mattress and pillows. In resistant cases a trial period of about a week in a hospital room which is equipped with an air filter and with rubber bedding is of great service.
both therapeutically and as a means of demonstrating whether or not the symptoms are due to some inhalant substance.

2. Desensitization. Desensitization probably never occurs in the human—a more accurate term is hyposensitization but both terms are used. Desensitization consists of an attempt to increase the resistance of the patient to the offending substance or substances—if the procedure is carried out correctly it is usually more or less successful and permits the patient to withstand ordinary amounts of allergen which he is forced to meet in his daily life. Hyposensitization is attempted for those allergens which cannot be completely avoided, e.g. pollens, molds, dusts, animal derivatives, eggs, wheat and milk, etc.

The principle of desensitization consists of subjecting the individual to gradually increasing dosages of the substances to which he is allergic until the skin and passive transfer tests become negative. Though results with desensitization are often excellent, an adequate explanation of the mechanism is still lacking. It is known, though, that the longer the treatment and the higher the dose which the patient can tolerate the smaller the previously positive skin reaction becomes.

Hyposensitization is usually done by hypodermic injection of the offending allergens but an oral technique has been used in egg, wheat and milk sensitivity. Good results are obtained with desensitization in 75 to 80% of cases of pollen asthma. According to Unger best results in pollen asthma are secured in patients who year after year receive large doses of the pollen extract. Failures are usually due to incorrect choice of the pollen extract, dosages which are too weak or too strong, to the use of deteriorated extracts and to the failure to test for and remove other conditions which aggravate symptoms. Hyposensitization with other extracts from epidermal substances, house dusts, molds, smuts, rusts, etc., also have given good results.

B—Non-Specific Treatment

Non-specific measures include those used for attacks of asthma and those which are useful between attacks or in chronic asthmatics.

(a) The drugs used in treatment of Asthma—

1. Epinephrin

Epinephrin is the most important drug in the treatment of attacks of bronchial asthma—it usually brings more or less prompt relief. It is considered that epinephrin acts by stimulating the sympathetic nerve fibres in the bronchi and producing bronchial dilations and by shrinking of the bronchial mucosa through vasoconstriction of the arterioles. The subcutaneous dosage is 0.3 to 0.5 cc. of a 1:1000 solution for mild attacks and 0.5 to 1.0 c.c. for more severe attacks. The effects usually wear off in an hour or more and the dosage can then be repeated as necessary. Side effects, e.g. tachycardia, trembling and palpitation, can be avoided by using repeated small dosages.
Inhalant epinephrin 1:100 solution can also be used. This gives considerable relief in mild attacks and is considered to be safe. Its use may prevent the onset of many severe paroxysms. In severe attacks this spray is of little use since the patient is often too short of breath to inhale deeply enough to enable the vapor to reach the bronchi.

Slow epinephrin is now used by some because of its more prolonged action—slow epinephrin consists of 1:500 solution in peanut oil. This solution is injected into the gluteal region intra-muscularly—relief with this is slower but lasts much longer, averaging 8 to 16 hours. Epinephrin in oil has been found valuable in severe asthmatics, both acute and chronic. Reactions to slow epinephrin are uncommon.

Epinephrin in gelatin has also been advocated but it has been generally found that this mixture is difficult to use since the gelatin mixture is hard to draw into the syringe and keep fluid.

2. Ephedrin

Ephedrin by mouth is effective for about an hour and is therefore of aid in mild and moderate attacks of asthma but it is practically useless in severe seizures. The dosage is 1/4 to 3/4 gr. of the hydrochloride or sulfate salt. There is no indication for the use of ephedrin by hypodermic as epinephrin gives more prompt and reliable results. Ephedrin is preferred to epinephrin in that it can be given by mouth, its action lasts longer and it causes less severe side reactions. However, the therapeutic effect is less pronounced and many individuals cannot tolerate the drug due to cerebral stimulation and insomnia, perspiration, palpitation and sometimes in older men difficulty with urination. Because of these undesirable side effects the drug is often combined with a sedative, usually one of the barbitals.

3. Orthoxine

Recently a new drug orthoxine has been reported in the literature which is given in doses of 200 mgm. This is considered to be comparable to 30 mgm. doses of ephedrin in effect. It has the advantage over ephedrin in that it has little or no pressor or central nervous system stimulating effect. It can therefore be used in hypertensive patients and also without the barbitals. The drug is given orally.

4. Aminophyllin

The intravenous use of 31/2 gr. or 71/2 gr. aminophyllin in 10 c.c. of solvent has been found to be of great value in severe attacks of asthma. It is often successful in patients who are no longer relieved by epinephrin. Its action is prompt but wears off in one to several hours.

Aminophyllin can be given orally or intramuscularly but it is of much less value than when given intravenously. The drug is thought to act directly by dilating constricted bronchi—side reactions are slight when used in proper dosage.

5. Morphine

Morphine should be employed in asthma only when other measures
fail, according to Tuft. Unger states that morphine should never be used in asthma, especially when other measures fail. The patient in severe status asthmaticus is already fighting for breath and the slowing of respiration by morphine may be just enough to cause death by asphyxia. Morphine is thought to cause death by depressing the cough reflex so that patients cannot expel the sticky sputum, and by depressing the respiratory centre, therefore causing increased anoxemia in a patient already short of oxygen.

6. Iodides

Potassium or sodium iodide is a useful drug. It acts in asthma by liquifying the sticky mucous. The drug is given in saturated solution in dosages of 5 to 10 grs. 3 to 4 times daily. It can be given over long periods of time without any untoward effects, except in rare instances of allergy. Ammonium chloride can also be used as an expectorant.

7. Asthma powders

These are condemned since the fumes are irritating to the respiratory system and the effect is no better than epinephrine.

8. Glucose

One thousand c.c. of 5 percent glucose in saline has been found to be of considerable value in status asthmaticus, especially when 1.0 c.c. of 1:1000 epinephrin is given intravenously with it. The exact mechanism of action of glucose is unknown.

9. Sulfonamides

Sulfonamides have been found of value in status asthmaticus especially in patients with an infective element as shown by a leucocytosis and increased sedimentation rate. However, sulfonamides are seldom resorted to at present.

10. Anaesthetics

Ether per rectum (2 oz. mixed with 4 oz. of olive oil) has been used in asthmatic where no relief could be obtained with other methods, with good results. If all measures fail and asthma continues severe, full ether anaesthesia for about 30 minutes by the drop method may be life-saving. Nitrous oxide, avertin, cyclopropane and urethane have been used with good results in treating asthma in a few cases. Their use is not general, however.

11. Hypnotics

Hypnotics are widely used in the treatment in bronchial asthma in combination with aminophyllin and ephedrin. They should be used only in moderate amounts since if given in excess they may decrease the ability of the patient to expel the sticky sputum of mucous which block the bronchioles.

(b) Miscellaneous considerations in the non-specific treatment of asthma—

1. Vaccine Therapy

Vaccines are indicated in patients whose symptoms occur after
"colds" or with change of weather and in asthmatics where skin tests are negative. Older patients have been found to derive more benefit than younger though vaccines may be helpful at any age. Stock vaccines or autogenous vaccines can be used. Not infrequently the results obtained by use of vaccines are brilliant and the patient may remain free of symptoms for months. In most cases, however, the condition relapses each year, especially in the fall and winter months, and injections must be resumed.

2. *Autohaemotherapy*

Marked improvement has been noted in chronic asthmatics following autohaemotherapy—5 to 20 c.c. of the patient’s blood is injected into the patient intramuscularly every 2 to 7 days until 250 to 500 c.c. blood have been injected. The action of the blood is unknown.

3. *Histamine*

Injections of histamine have been carried out in an effort to desensitize asthmatic patients on the theory that in allergic reactions the cause of the reaction is due to liberation of histamine or an H-like substance which causes the symptoms. Little success has been reported with this method. Histaminase has also been found to be useless in the treatment of asthma.

4. *Endocrine products*

No endocrine factor or combination of factors has been proven to be the cause of asthma and treatment of asthma with endocrine products has given very poor results.

5. *X-Ray Therapy*

Many patients with bronchial asthma have been definitely benefitted by x-ray therapy; however, the treatment is only temporary, lasting only a few weeks or months. X-ray therapy is not generally used but can be tried in resistant cases of asthma.

6. *Treatment by Hyperpyrexia*

It was observed by many allergists that almost all asthmatics are temporarily improved just after fever from any cause. Therefore various methods of inducing fever have been tried in the treatment of asthma—all of these have been disappointing except by the induction of malarial fever, and this is too dangerous to warrant its usage for temporary relief.

7. *Removal of Foci of Infection*

Foci of infection should be removed for hygienic reasons but such procedures usually have little or no permanent effect on asthmatic symptoms.

8. *Bronchoscopic Aspirations*

These are often of direct benefit. Aspirations can be repeated as necessary.

9. *Surgical Treatment of Asthma*

Cutting of the vagus nerves or section of both sympathetic and parasympathetic nerves at the posterior pulmonary plexus has led to excellent
results. However, the procedures are not without danger and the improvement has usually been found to be only temporary.

Summary

The Etiology and Treatment of Allergic Bronchial Asthma has been briefly discussed. It has been pointed out that three important factors must be considered in the Etiology—the constitutional basis, the contributory factors and the exciting factors. These have been commented upon. Treatment has been divided into specific treatment and non-specific treatment—specific treatment consisting of elimination of the offending allergens and hyposensitization. The drugs used in non-specific treatment have been discussed. Numerous non-specific methods of therapy other than the above have been commented upon.
THE TREATMENT OF BURNS
D. A. J. MOREY, '50

The treatment of a burn is dependent upon three factors:
(a) the depth of the burn,
(b) the extent of the burn,
(c) the complications.

(a) The Depth of Burns
Many classifications have been proposed for burns graded according to the depth to which the tissues have been burnt. However, from the point of view of subsequent treatment the following classification is of practical value:
(i) those burns which do not require skin-grafting, i.e. burns which do not completely destroy the epidermis, or in which regeneration may be expected from residual hair follicles, sebaceous glands and sweat glands.
(ii) those burns which require skin-grafting, i.e. burns which have destroyed the epidermis, the corium and all hair follicles and glandular structures in the skin.

(b) The Extent of Burns
The extent of a burn, i.e. the amount of body surface burned, is an important factor in the prognosis of burn treatment. Burns involving 20% or more of the body surface must be viewed with grave concern. Where the area exceeds one-third of the total surface area the prognosis is extremely poor. However, site and age are important factors which frequently modify the prognosis. The face, head, perineum and areas of thin skin when burned are associated with complications of severe shock and toxaemia. Children and the aged often exhibit severe or fatal shock following relatively small areas of burn.

(c) The Complications
The complications anticipated in the treatment of all burns are:
(i) Primary shock,
(ii) Secondary shock,
(iii) Toxaemia,
(iv) Infection.

(i) Primary Shock
This is a state of vascular collapse which usually onsets almost immediately following the burn, and is marked by extreme pallor, cold sweat, weak accelerated pulse, shallow irregular breathing, subnormal temperature and restlessness.

(ii) Secondary Shock
This is a state which mimics the signs of primary shock, except for a lack of dyspnoea and restlessness, which are replaced by quiet respiration, drowsiness, and a slight rise in temperature. It onsets usually about 48 hours after the burn, where treatment has been absent or ineffective.
Secondary shock is due to a change in the blood volume and the blood constituents as the result of plasma loss at the burn surface and a consequent increase in the relative volume of the red blood cells, i.e. haemoconcentration. The resultant increase in viscosity, the reduction in volume of the blood, and the electrolyte disturbance lead to reduced oxygen and fluids supplied to the tissues. A continuation of this state for more than 36 hours results in death due to anoxia of the medullary centres.

(iii) Toxaemia

Between the second and the fifth day after the burn the onset of the state of toxaemia may be revealed by persistent vomiting, hyper-pyrexia, tachycardia, oliguria or anuria, drowsiness and convulsions, which progress to ultimate coma and death.

It is thought that the explanation of this state is due to the liberation of toxic substances into the blood stream from the necrotic tissues at the burn site, which damage the functions of the liver and kidneys. This process is aggravated by the dehydration and poor oxygen supply to the tissues.

(iv) Infection

Normally most burn sites are sterile unless subsequently contaminated with pathogenic bacteria. In some instances, however, where the depth of burn is limited to the most superficial tissues, bacteria may be alive along the hair shafts or in the hair follicles, which may spread to the adjacent blisters and thence into the surrounding tissues.

Intercurrent infection may supervene where prolonged exudation has been permitted and has led to a chronic protein depletion and loss of resistance.

The Treatment of Burns

The treatment of a burn case may be divided into the following aspects:

(a) General treatment,
(b) Local treatment,
(c) Rehabilitation.

(a) General Treatment

This comprises the alleviation of primary shock and the institution of measures which will prevent the onset of secondary shock and toxaemia, will restore the body’s resistance to infection and promote the growth of granulation tissue and epidermis at the injured site.

General treatment may be considered under the following headings:

1. First Aid

   (i) The relief of pain. The National Research Council of Canada recommends the following initial dose in major burns:
1/6th grain of Morphine intravenously.
1/6th grain of Morphine subcutaneously.

(ii) The administration of plasma or other blood substitutes intravenously in all cases of major burns. This may not be possible until hospitalization.

(iii) The maintenance of a sterile burn site. Do not remove any adherent clothing at this time but bandage firmly with a sterile dressing. If there will be a delay before the patient can be hospitalized, sterile petrolatum on gauze may be applied to the exposed burn surfaces.

(iv) Maintenance of body temperatures. This is best accomplished by wrapping in warm, dry blankets, but care must be taken to avoid overheating and the resultant vaso-dilatation which would further embarrass the circulation.

(v) Penicillin should be administered prophylactically, where possible.

2. Subsequent treatment

Upon hospitalization the initial step is the restoration of blood volume. This is done by the intravenous administration of undiluted plasma or serum by venepuncture or "cut-down" following the estimation of the haematocrit and the haemoglobin percentage. Whole blood should not be used at this time unless there has been considerable blood loss, but normal saline administered, especially if there has been chloride lost by vomiting, or if the blood chloride is low.

The amount of plasma required can only be determined by the haematocrit and haemoglobin readings, estimations of which should, therefore, be carried out at frequent intervals and continued for at least 48 hours. A rough guide to the amount of plasma to be given is 75 c.c.'s for each percentage of body surface burned for the first 24 hours, half of which is administered during the first 8 hours.

The blood pressure, pulse pressure and pulse rate should be recorded periodically as they are good indicators of the effectiveness of therapy. The blood chloride may be estimated to determine the need for intravenous saline. The lungs should be auscultated frequently in order to avoid moisture at the bases when plasma or saline are being administered rapidly. Oxygen may be administered by mask or nasal tube in the event of cyanosis and dyspnoea.

When infection is present it should be treated with the antibiotics.

Intravenous glucose may be administered if the patient is unable to take food by mouth.

(b) Local Treatment

The object of local treatment is to prevent further plasma loss, to present infection of the burned tissues and to prevent subsequent deformity due to scarring and keloid formation.
(i) Cleansing of the Burned Surface

It has been considered advisable that preliminary cleansing of the burned surfaces should not be carried out in a badly shocked patient, but that following the removal of gross fragments of clothing, epithelium and foreign materials, the burned surface should be enclosed in an occlusive pressure dressing. However, in those patients who have recovered from primary shock and are in good condition, the gentle washing of the site with copious quantities of warm sterile water and a non-irritating soap may be profitable.

Blisters that occur on the hairless surfaces of the body may be left unopened, but where the surfaces bear coarse hairs, which may carry pathogenic bacteria, the blisters should be unroofed by cutting the dome of the blister away with sterile scissors.

(ii) Dressing the Burned Surface

Many methods of dressing the burned areas have been advocated. One which has been favourably received is the occlusive pressure dressing, which is left for a considerable length of time without change. Its purpose is to apply an absorptive dressing to the wound with sufficient pressure to limit the amount of tissue fluid exuding from the burned surface, and to prevent the development of infection at the site. The occlusive pressure dressing consists of:

1. an inner layer of cheese cloth impregnated with a topical application, such as petrolatum, boric acid ointment or liquid paraffin.
2. several layers of gauze heavily smeared with the topical application.
3. a layer of cotton waste, 2 to 3 inches deep.
4. a flannelette or crepe bandage to compress the waste.
5. adhesive strips to fix the bandage in place.
6. a light plaster of paris shell, if necessary, to immobilize the limb, e.g. a delirious patient, travel, etc.

When a joint is immobilized in a dressing, it is important to place the limb in such a position that contracture is not encouraged and maximum mobility to the limb ensured, e.g. place the fingers in extension if the palmar surface is burned, or in flexion if the dorsal surface in burned.

This occlusive dressing is left in place for one or two weeks, by which time the slough over the wound should have separated and a healthy granulation tissue formed. If the slough is not yet ready for excision a new occlusive dressing is applied and left for 10 days. It is often advisable with large burns to remove the first dressing under a general anaesthetic.

(iii) Skin Grafting

Where no epidermal structures have been left to regenerate a new epithelium, the granulation tissues grow into the area and form a scar which subsequently contracts and may produce marked deformity and an
unsightly appearance. In many instances this result may be prevented by the transfer of sections of healthy epidermis containing the germinal layer of cells from a healthy site to the burned area.

The split graft is the preferred method, in which thin grafts (10/1000 - 16/1000 of an inch thick) are removed by an adjustable dermatome from the lateral surface of the thigh, the scapula, the costolumbar or buttocks areas and transferred to the burn area (from which all the slough has been removed) and placed upon the healthy granulation tissues.

If the split graft method is not possible, pinch grafts may be used. Small areas of skin are pinched and pulled up by means of forceps and the small postage stamp sized section cut off and transferred to the granulating area.

In order to ensure a successful "take" of these grafts it is necessary to eliminate any hypoproteinaemia and to establish a positive nitrogen balance. This may be achieved by whole blood transfusions (especially if there is a secondary anaemia present) or by amino-acid administration. Wherever possible a diet high in protein and carbohydrate should be given by mouth, together with adequate amounts of vitamins A, B, C and D.

(c) Rehabilitation

It must be remembered that burns may leave residual scars which may seriously handicap the social and economic rehabilitation of the individual. Every effort must, therefore, be made in the treatment of burn cases to obtain an optimum result in the functional activity of the burned part and in its cosmetic appearance. Such a result may call for subsequent physio-therapy or plastic surgery.

BIBLIOGRAPHY
NAUSEA AND VOMITING INDUCED BY PREGNANCY OR BY ADMINISTRATION OF SYNTHETIC ESTROGENS; TREATMENT WITH ANTI-HISTAMINIC COMPOUNDS

J. W. Finch
Am. J. Obs. & Gyn., 58: 591-594, 1949

The nausea and vomiting of pregnancy are believed by the author to be allergic reactions to an unidentified hormone which probably arises from the corpus luteum of pregnancy. Of twenty-nine such cases, twenty-seven were greatly improved by the oral administration of either Benadryl or Histadyl. The dosage was 50 mg. the first day, followed by a daily increase of 50 mg. until symptoms were relieved. In this way side-effects (drowsiness, vertigo) are minimized.

The nausea and vomiting induced by the synthetic estrogens (diethylstilbestrol; hexestrol) also seem to be allergic phenomena. Twenty-one such patients were able to tolerate full dosage of these drugs if given 150-200 mg. of either Benadryl or Histadyl at the same time as the synthetic estrogen.

Finch presents very strong evidence for his views on this type of allergy in the above paper which is the fourth he has prepared on the subject.

—ROBERT HAGGAR, '50

INDICATIONS FOR SPLENECTOMY

L. R. Limarzi, ET AL
Am. Pract., 4: 25-33, 1949

In the normal individual the spleen may be removed without any serious consequences, since the remaining hemopoietic organs will assume its functions. In certain pathological conditions, however, the spleen may endanger life. In general, the indications for splenectomy can be divided into two main groups:

I. Non-Hematologic conditions
1. Traumatic: rupture, hemorrhage and torsions
2. Ptosis of the spleen
3. Primary splenic tumors
4. To aid in exposure and permit radical procedures in surgery of the left upper quadrant.

II. Hematologic conditions—Primary or Secondary
1. Congenital hemolytic jaundice
2. Idiopathic thrombocytopenic purpura
3. Primary splenic neutropenia
4. Primary splenic pancytopenia
5. Splenic vein thrombosis

Among the commoner contra-indications, for splenectomy are leukemia, Hodgkin’s disease, polycythemia vera, aplastic anemia, liver cirrhosis and parasitic splenomegaly.

—H. J. WILLIAMS, '50

SMALL BOWEL OBSTRUCTION IN INFANCY AND CHILDHOOD: A RADIOLOGICAL INTERPRETATION

CHARLES STORCH, BERNARD REDNER AND RICHARD D. TURIN

The x-ray diagnosis of small bowel obstruction in infants and young children is extremely difficult. Such a diagnosis depends upon the differentiation between the small bowel containing normal amounts of gas and the small
bowel containing abnormally large amounts of gas. By means of simple diagrams and X-ray plates, the authors illustrate the radiological appearances of the normal small bowel and the obstructed small bowel. This differentiation is reasonably easy to see. It is pointed out that if there is some doubt after inspection of the initial X-ray plate, another film should be taken a few hours later, thus establishing the presence or absence of progressive distention of the bowel loops. The differential diagnosis between small and large intestine is also explained.

Five cases are briefly outlined, accompanied by their respective X-rays. The films of these cases illustrate the varying picture seen in small bowel obstruction in infants and young children.

—James Warden, '50

REFORM IN MEDICAL EDUCATION
W. Melville Arnott
Br. M. J., 2:497-502

A brief consideration will show that education in medicine has developed more according to the dictates of expediency and tradition rather than as a result of integrative development based on continuity of principle. Medicine is essentially a science. Enlightened promotion of health and care of the sick must be based on scientific method.

Sometimes, in order to give patients comfort from their fears, the physician frequently has to pretend to a degree of insight and confidence that he so sadly lacks. Under these circumstances, scientific method tends to languish. An important aspect of scientific method is that it tries to be quantitative and a serious fault of modern education is that insufficient training is given in "size" language.

Progress in medicine has often been retarded by established authority. The mark of a good medical school is that consideration is given to students who doubt, criticize, or ask questions.

For good results in medical education, instructors of high calibre should be employed. Non-clinical departments, staffed with full-time teachers, can obtain instructors of national or international reputation. On the other hand, clinical departments employ instructors on part-time basis and their choice is therefore restricted to local practitioners.

The most fundamental characteristic of a medical teacher, and especially a clinical teacher, is that he is thoroughly trained in the method of science. Secondly, he has extraordinary clinical ability. Lastly, he has the capacity to inspire others and to get the best out of them.

Regarding the selection of students, it has been shown that the problem is complex and fundamentally hampered by ignorance of the qualities necessary for success in medicine.

The medical student has not appreciated the fact that knowledge is one and indivisible. To help him do this, attempts are being made to integrate the medical curriculum. At Birmingham, there has been effected a fusion of Anatomy and Physiology.

Because of increasing medical knowledge, the student is in danger of being overwhelmed by a flood of facts. This is due not so much to acquisition of new knowledge, but failure to discard the old.

To be of value to the student, clinical teaching must be carried out in small groups. Undue emphasis is at present being put on physical signs and insufficient attention paid to disordered function as revealed by the history of the disease.

A welcome development in clinical teaching has been the enlargement of the scope of social medicine. The clinician is now interested not only in the disease process, but also in the influence of the environment on the disease and the effect of the illness on the patient's family. This development has occurred at a time when the new social Acts can provide a wide range of assistance to victims of accident and illness.

—John Agnos, '52
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