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Tick Paralysis: For many years tick paralysis has been recognized in the Canadian and American northwest, but only in the past decade have case reports begun to appear from the eastern United States. Though uncommon, the disease is important because it may be confused with poliomyelitis and, if unrecognized, may be fatal. The diagnosis is often readily confirmed by finding an engorging tick and by prompt recovery of the patient after its removal.

In the summer of 1948 four patients with tick paralysis were observed at Grady Memorial Hospital, Atlanta, Georgia. These cases are being reported to emphasize an unfamiliar hazard in the eastern United States.

Case 1. A 3-year-old white farm girl from Haxlehurst, Ga., was admitted 13 May 1948. She was well until two days before admission when she had three loose stools. The next day she got up in the morning but soon returned to bed. A little later she was unable to walk. She could move all extremities, but fell on attempting to stand. In the afternoon she became unable to sit up or raise her head. During the night she was irritable and hypersensitive, and screamed when touched. The legs were weak and the right arm was paralyzed. On the morning of admission she could still move the legs and left arm slightly. Her speech was indistinct and she choked on attempting to swallow. The choking became worse and breathing difficult. She lost consciousness just before entering the hospital at 3 p.m.

The child appeared moribund. She was limp, comatose, drooling, and choking on pharyngeal secretions. The rectal temperature was 98.2° F., pulse 130, respirations 28. Breathing was shallow and diaphragmatic. The limbs were flaccid and motionless. Tendon and abdominal reflexes were not obtainable. There was little if any stiffness of the neck. Slight lateral nystagmoid movements of the eyes were noted. The nose and pharynx contained mucoid secretions, and the gag reflex was absent. A search of the scalp and body for ticks revealed none.

The nose and pharynx were aspirated frequently, the foot of the bed elevated, and the head turned to the side. Oxygen was given nasally. Penicillin was administered intramuscularly, 40,000 units every six hours. Parenteral fluids were given. By 6:00 p.m. consciousness had returned and the speech, though thick and nasal, was comprehensible. During the night she could move all extremities, but there was marked weakness. She was unable to turn in bed, and when lifted the head fell back limply. The respirations became deeper and easier. On 14 May she could move her limbs better but the neck muscles were still weak. The knee jerks were present. Speech was normal and pharyngeal secretions gradually ceased accumulating. On 15 May the gag reflex had returned and she could take fluids by mouth. The respiration was normal and she was able to sit up. Weakness of the hands and neck flexors was still noted, but gradually subsided. All motor power quickly returned. On 16 May she was walking about in bed, and by 17 May recovery was complete.

There was no fever. No sensory loss was detected. Except for incontinence of urine during the first twenty-four hours of hospitalization, the bladder and bowel functioned normally throughout. The child was well when discharged on 20 May.

On admission the leucocyte count was 13,280 with 81 percent polymorphonuclears, 16 percent lymphocytes, 2 percent monocytes, and 1 percent eosinophiles. The Kahn test was negative. Lumbar puncture on 14 May revealed clear fluid containing 4 lymphocytes per cubic millimeter, with 14 mg. of protein and 62 mg. of sugar per hundred cubic centimeters. The Pandy test was negative, and there was no growth on culture.

The initial impression was poliomyelitis. However, the absence of fever, the minimal stiffness of the neck, and the normal spinal fluid, combined with the extraordinarily rapid recovery, seemed to weigh against this diagnosis. The nature of the disease remained a mystery until the parents came to take the child home. It was then learned that on 13 May an engorged tick had been found attached to the scalp above and behind the right ear. It was removed by the parents at about noon, three hours before admission. This information, together with the typical clinical picture, established the diagnosis of tick paralysis.

The tick removed from the patient was not preserved, but several days later the father sent 6 ticks collected from dogs at the child's home. These were identified as females of Dermacentor variabilis. One was unengorged and five were in various stages of engorgement. Some of them deposited large numbers of ova.

Case 2. A 4-year-old white girl also from Hazlehurst, Ga., but living some miles away from the patient of Case 1, was brought to the emergency room 28 May 1948, because of difficulty in walking. She was well until the morning of 27 May when she showed poor control of her legs and an unsteady gait. This improved somewhat toward evening but was worse on the morning of 28 May. There was marked weakness and ataxia of the legs. The child was unable to walk without support, but paralysis was never complete. At 9:00 a.m. the parents found and removed two ticks, one large and one small, which were attached to the scalp in the right occipital region. On arriving at the hospital about 7:30 p.m. she had already improved considerably. There had been no fever.

The child was alert and could walk, although the gait was unsteady and with a wide base. The rectal temperature was 99.2° F. There was no stiffness of the neck or back. The cranial nerves were normal. All extremities could be moved, and there was little or no detectable muscle weakness. The upper abdominal reflexes were present, the lower ones were not obtained. Knee jerks were absent. Ankle jerks were present and equal. Bite marks were visible on the scalp where the ticks had been attached.

A diagnosis of tick paralysis was made from the history and the finding of ataxia of the legs with absent patellar and lower abdominal reflexes. The parents were allowed to take the child home without further treatment.

Case 3. A 6-year-old Negro girl from Lexington, Ga., was admitted to the hospital 15 June 1948, because of difficulty in walking. She was well until the evening of 12 June when she seemed feverish. On the morning of 13 June she was weak in the knees and could not walk. She complained of stomachache and had three loose bowel movements. Later in the day the gait was unsteady but she was able to walk about by holding onto objects. On 14 June the legs were still weak though not entirely paralyzed. She could not climb onto her tricycle, but was able to pedal it when placed on the seat. She fell on attempting to get off. At 11:00 a.m. she was seen by a physician who found her unable to stand; he suspected poliomyelitis. She was admitted to the hospital at 11:00 a.m. 15 June. In the meantime some improvement had occurred.

The child did not appear acutely ill. The rectal temperature was 100° F. She was able to stand alone, but the Romberg test was positive. She could walk with an unsteady gait on a wide base. There was no grossly detectable weakness of the extremities, but the knee and ankle jerks were absent. The plantar reflex responses were flexor. Tendon reflexes in the arms were brisk, and abdominal reflexes were normal. The neck was supple, and Kernig's sign negative. A partially engorged tick was found attached to the scalp in the left temporal region. It was removed at 12:30 p.m. 15 June.

On admission the leucocyte count was 9,200 per cubic millimeter with 52 percent polymorphonuclears, 46 percent lymphocytes, and 2 percent monocytes. The Kahn test was negative. Lumbar puncture yielded a clear colorless fluid containing one leucocyte per cubic millimeter, with protein 12 mg. and sugar 56 mg. per hundred cubic centimeters. No growth was obtained on culture of the fluid. The tick was identified as a female of D. variabilis. Several days after removal it deposited a large number of ova.

By the morning of 16 June, twenty-two hours after removal of the tick, the child's gait had improved but was still slightly ataxic. The Romberg test was negative. The left ankle jerk was obtainable with reinforcement. The right ankle jerk and both knee jerks remained absent. On 17 June the gait was normal. The left ankle jerk was easily obtained, the right was weakly present with reinforcement and improved slightly by the next day. On discharge 18 June, the child appeared well but the knee jerks were still absent and the right ankle jerk was weaker than the left. There was no fever during hospitalization.

Case 4. A 2-year-old white boy from Monroe, Ga., was brought to the hospital 3 July 1948, because of difficulty in walking. He was well until two days before admission when he became irritable and began walking as though drunk. He cried whenever his legs were moved and preferred to lie

quietly. Next day the legs were weaker; he was still able to stand and walk a few steps although use of the legs seemed painful. A physician found the temperature to be 101° F. rectally, suspected poliomyelitis, and the boy was admitted to the hospital at 9:00 p.m. 3 July.

The child was robust. He resented being disturbed and screamed loudly during the examination. It was impossible to tell whether this was due to pain or apprehension. There was no stiffness of the neck. Kernig's sign was negative. Cranial nerves and upper extremities were normal. Generalized weakness of the legs was noted, without complete paralysis of any muscles. The child could stand alone, though weak and wobbly; the gait was unsteady, and with a wide base. The Romberg test was positive. Biceps, triceps, and abdominal reflexes were present and equal bilaterally. Knee and ankle jerks were absent. The plantar reflex responses were normal. Sensory examination was unsatisfactory but revealed no anesthesia. A partially engorged tick was found attached to the scalp in the occipital region, and removed.

On 4 July, twelve hours after removal of the tick, the child was much less irritable. He sat up well but the Romberg test was still positive. The gait continued to be jerky, unsteady, and with a wide base. He cried while walking as though in pain. Knee jerks were present. On this day (one of the hottest of the summer with air temperature nearly 100° F.), he took fluids poorly and his rectal temperature rose to 101° F. There was no evidence of infection. On 5 July, thirty-six hours after removal of the tick, some diffuse weakness of the legs remained. All tendon reflexes were present, equal, and hyperactive. The maximum rectal temperature was 100.2° F. On 7 July, three and one-half days after removal of the tick, the child did not yet walk willingly. His gait, though improving, was still unsteady and with a moderately wide base. Upon the insistence of his parents he was discharged from the hospital on 7 July. A physician later wrote that recovery was complete.

The blood leucocyte count on 4 July was 15,200 with 53 percent polymorphonuclears, 44 percent lymphocytes, one percent monocytes, and 2 percent eosinophiles. On 5 July the leucocyte count was 12,100. The Kahn test was negative. Lumbar puncture on admission revealed clear fluid containing 2 lymphocytes per cubic millimeter, with 20 mg. of protein and 68 mg. of sugar per hundred cubic centimeters. Pandy test on the spinal fluid was negative, and culture yielded no growth. The tick removed from the patient was identified as a female of D. variabilis.

Various species of Ixodidae or hard ticks have been reported to cause paralysis. The Argasidae or soft ticks have not been implicated. While engorging on its victim, the tick apparently injects a neurotoxin. This toxic agent is thought to act upon the spinal cord and bulbar nuclei, causing incoordination, weakness, and paralysis. Evidently it is rapidly destroyed or excreted, for when the tick is removed the nerve cells regain normal functions

Tick paralysis has been produced in experimental animals only with gravid female ticks, and this observation led to the theory that the toxin was elaborated by the ova. Although various toxic extracts have been prepared from tick eggs, the toxin causing paralysis in naturally occurring cases has not yet been definitely identified.

It appears that the tick must feed for several days before symptoms develop. Paralysis has occurred in infants after a tick has engorged for four days and various studies indicate that large amounts of toxin are injected on the fifth and sixth days. Female ticks may feed on a suitable host for periods ranging from four to ten days or more, usually from seven to nine. Paralysis becomes evident in experimental animals after from five to seven days of engorgement. Male ixodid ticks feed for a shorter period and engorge to a lesser degree. It has been suggested that this may explain why the female is more effective in producing paralysis. At least one case is on record, however,

of paralysis caused by a male D. andersoni. The tick was attached in the axilla of an adult, causing partial paralysis of the arm on the same side. This cleared within twelve hours after removal of the tick.

Because the salivary glands of ticks enlarge enormously while feeding, it has been postulated that the toxin is present in the saliva and is introduced into the host in increasing amounts during the final stages of engorgement. Tick salivary glands were injected into animals with unconvincing results. Other workers were unable to produce paralysis with salivary gland extracts. In some patients paralysis has continued to progress despite removal of the tick and improvement did not begin until broken-off mouthparts were excised. Such instances suggest that the mouthparts contain a high concentration of toxin. The nature of the toxin is still unknown. It is not clear whether it is formed in the salivary glands, or whether the saliva simply transmits or perhaps also activates a toxin formed in the ova or elsewhere.

Most cases in human beings occur in children, especially in young girls. The tick is usually attached to the scalp and hidden by the hair. Both white and Negro races are susceptible.

Irritability may be noted twenty-four hours before appearance of motor symptoms. Mild diarrhea may occur. Often the first alarming symptoms appear in the morning when on arising the child shows weakness and poor control of the legs, staggering, and falling. Sensory changes are usually absent, but there may be hyperesthesia and paresthesia in the affected extremities. Flaccid paralysis soon develops and ascends in one or more days to involve the trunk, arms, neck, tongue, and pharynx. Tendon reflexes are diminished or absent. If the trunk is affected the abdominal reflexes are also unobtainable. There is little or no stiffness of the neck and back. With the appearance of bulbar involvement the voice becomes thick and nasal; the child is unable to swallow and chokes on pharyngeal secretions. Nystagmus and strabismus are sometimes noted, and in infants terminal convulsions may occur. The respirations become abdominal in type, shallow, rapid, and finally irregular. Restlessness gives way to stupor and death results from paralysis of the respiratory muscles or from respiratory obstructions by aspirated material.

The temperature seldom exceeds 100° F. unless there is a secondary infection. The leucocyte count is usually normal, although a leucocytosis of from 10,000 to 17,000 cells per cubic millimeter is occasionally observed. The spinal fluid is almost always normal. The erythrocyte count, hemoglobin, and urine show no changes.

If the tick is removed before appearance of bulbar signs, the paralysis subsides and recovery is complete within a few days. Patients with milder cases may be quite well within twenty-four hours. Nevertheless, all patients should be observed carefully until recovery is well under way, because if other

ticks or retained mouthparts have been overlooked the paralysis may progress. When bulbar or respiratory paralysis develops, death may occur if the tick is not removed in time.

The tick is usually located on the scalp or neck, but may be attached to any part of the body, especially the ear, axilla, groin, vulva, or popliteal space. It should be removed immediately, with care to avoid breaking off the mouthparts and allowing them to remain imbedded in the skin. Mouthparts which have been retained should be excised promptly. The whole body surface should be searched for other ticks.

In advanced cases respiratory and bulbar paralysis dominate the picture. If the patient cannot swallow and is choking on pharyngeal secretions, the foot of the bed should be elevated and the head turned to the side to promote postural drainage. Frequent aspiration of the pharynx should be performed. Nothing should be given by mouth until the patient is able to swallow normally. Parenteral fluids are indicated. Sedatives and narcotics should be avoided. Penicillin, given parenterally, is useful in combating aspiration pneumonia. Oxygen should be given. When paralysis of the diaphragm and intercostal muscles is present, a respirator may be life saving. If no respirator is available other methods of artificial respiration should be tried. Unfortunately, bulbar and respiratory involvement usually co-exist. Patients with puddling of pharyngeal secretions should not be placed in a respirator unless actually unable to breathe; there is too much danger of aspiration into the tracheobronchial tree. An apparently moribund patient may show striking improvement in respiration within a few hours after removal of the tick.

Tick paralysis in man and animals was first mentioned in Australia more than a hundred years ago. In 1904 it was described as affecting sheep in South Africa. Later cows, horses, rabbits, guinea pigs, dogs, cats, and other animals have been found susceptible. The disease is commonest in the young of the various species; older animals appear to be relatively resistant. The first cases in human beings in North America were reported from British Columbia in 1912, followed shortly by others from Oregon and Idaho. Since then the disease has been recognized in Crete and Yugoslavia, and many additional reports have been published from the northwestern United States and western Canada. The first cases from the eastern states were reported from South Carolina and Georgia in 1938.

In the northwestern United States and adjoining portion of Canada the wood tick, Dermacentor andersoni Stiles, is usually responsible. The distribution of cases corresponds with the northern part of the range of this tick including British Columbia, Alberta, Washington, Oregon, Idaho, Montana, Wyoming, and Colorado. No reports have yet appeared from California, Nevada, and Utah where D. andersoni is also prevalent, nor from North and South Dakota, Kansas, Arizona, and New Mexico which are on the fringes of its known range. A unique case from British Columbia was attributed to the bird tick Haemaphysalis cinnabarina.

In the eastern United States the dog tick, Dermacentor variabilis Say, has been responsible for paralysis in cases in which positive identification of the tick was made. Reports from South Carolina and Washington, D. C., of finding D. andersoni on patients with tick paralysis are subject to question since D. andersoni is not known to occur in the East. On the other hand D. variabilis is widely distributed over the eastern United States as far west as Texas, Oklahoma, and Nebraska, and is also prevalent in California.

Since 1938, three cases of tick paralysis have been reported from Georgia and three from South Carolina followed by single cases from North Carolina, New York, and the District of Columbia, two from Kentucky, and three from Virginia. In all, 14 cases occurring east of the Mississippi River have been reported, and one from Texas. As yet the disease has not been reported from New England. Additional cases might be expected throughout the range of D. variabilis.

The Grady Memorial Hospital serves as a referral center for poliomyelitis, and the 4 patients reported upon arrived with that diagnosis. McCue, Stone, and Sutton, in a similar center at Richmond, Va., saw three patients with tick paralysis referred as poliomyelitis. Poliomyelitis was also the initial diagnosis in many other reported cases of tick paralysis. The seasonal incidence of both conditions contributes to this confusion. Tick paralysis occurs in warm weather when ticks are active, and when poliomyelitis is also likely to be prevalent. The twelve eastern cases for which date of onset is available and the four cases cited occurred in the following months: one in March, 2 in May, 6 in June, 6 in July, and one in August. It is especially important that those who treat acute poliomyelitis be aware of the possibility of tick paralysis because early diagnosis and tick removal may save patients who would otherwise die with a mistaken diagnosis of bulbar poliomyelitis.

Several features of tick paralysis are helpful in differentiating it from poliomyelitis. Usually there is no fever and the spinal fluid is normal. Muscle spasm is absent, and there is little or no stiffness of the back and neck. Marked ataxia often precedes paralysis by several hours or even days, first in the legs, then in the arms. Ascending involvement is particularly suggestive of tick paralysis, although progression of paralysis without fever is uncommon in poliomyelitis. The muscular weakness in typical cases is diffuse and bilateral. It is usually but not necessarily symmetrical. Generally there is equal involvement of the legs, but sometimes the tendon reflexes return more rapidly on one side than on the other.

Other conditions which may be considered in differential diagnosis are polyneuritis, myelitis, infectious neuronitis (Guillain-Barre syndrome), syringomyelia, and spinal cord tumor. Such diagnoses can be dismissed when a tick is found and prompt recovery follows its removal. Furthermore, these conditions

usually show characteristic sensory involvement. Although hyperesthesia and paresthesia may be present in the early states of tick paralysis diminution or loss of skin sensation rarely if ever occurs.

The speed with which progression of the paralysis occurs varies widely. The patient of one reported case showed symptoms for only two days before removal of the tick, but died of respiratory paralysis. This was the only fatal outcome in the eighteen eastern cases. In contrast, the duration of symptoms before tick removal was reported to be nine days in a case with bulbar involvement, and ten days in another case with marked ataxia but no paralysis or bulbar signs. Both these patients recovered.

Stanbury and Huyck cite the greater severity of the Australian disease in which the height of paralysis may not be reached for forty-eight hours after removal of the tick, and recovery may require weeks. Local paralysis has been reported in cases in which the tick was attached in the external auditory canal with homolateral facial paralysis. Also described are ptosis of the brow and eyelid with a tick attached to the temple, and partial paralysis of the arm with a tick in the axilla. A similar case was reported from Alberta. The factors which determine whether the paralysis is local or of the ascending type are not known.

Thus far no cases of tick paralysis have been attributed to Amblyomma americanum. This tick heavily infests large areas of the southern and southeastern states and has recently been found like D. andersoni and D. variabilis, to serve as a vector of Rocky Mountain spotted fever and tularemia. (J. Pediat., March '49, J. C. Ransmeier)

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Results of Operations for Protruded Lumbar Intervertebral Disc: During the ten-year period from 1938 to 1947, inclusive, 224 patients were operated upon by one of the authors for protruded intervertebral disc in the lumbar area. No thoracic or cervical protruded disc cases were included in this study. Of the 224 cases, 129 were compensation cases. Classed as compensation cases are those in which the patients not only had their medical bills paid by an insurance carrier but also drew compensation while they were off work and were given a permanent disability award if any disability remained at the time their cases were considered stationary and, therefore, were closed. The compensation cases were covered by a total of 11 insurance carriers. Ninety-five of the 224 cases were private. The operative mortality for the 224 patients was zero.

Fairly wide laminectomies were done on some of the first patients in the series whereas all those operated upon in recent years had interlaminal

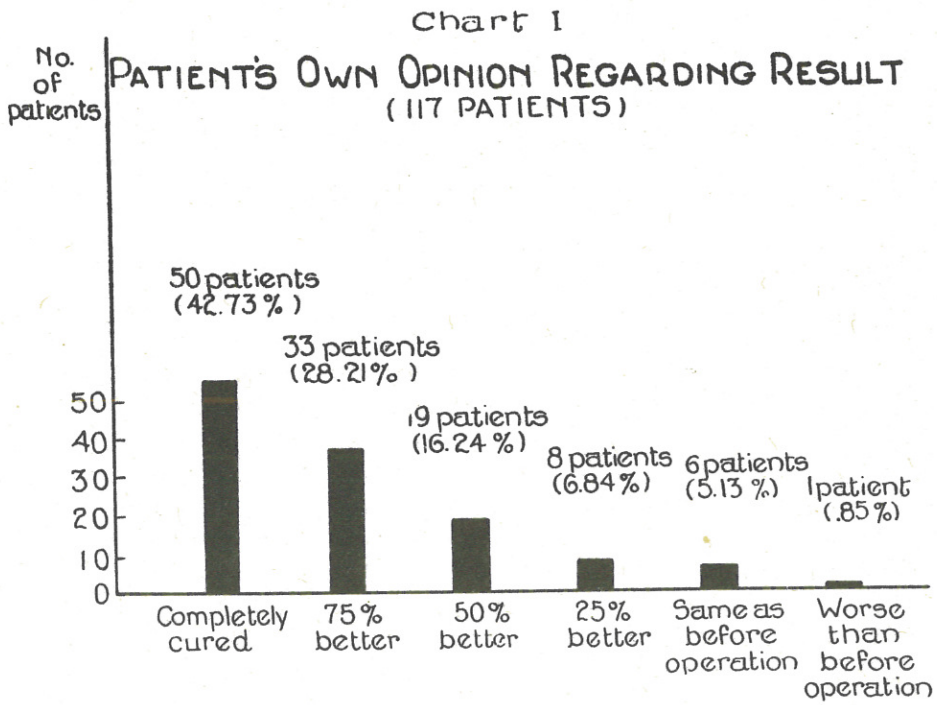
explorations with little or no bone removed except when a very large protrusion was present.

Five of the 224 patients required second operations. Re-exploration showed that 2 of the 5 had recurrences of the protrusions, although in 3 no recurrence was found. Following re-exploration and spinal fusion, the 2 with the recurrences and one other had been relieved, although 2 of the 5 are no better.

On the basis of questionnaires, insurance company records, and office records, the end results following surgery were evaluated in 160 of the 224 patients. The others were eliminated from the follow-up study for one or both of the following reasons: (1) sufficient information was unavailable regarding the patient's present condition, and (2) less than one year has elapsed following operation. Information regarding the results came chiefly from (1) office and hospital records, (2) questionnaires answered by the patients, and (3) records of the insurance carriers in those cases covered by compensation.

A questionnaire was sent to all of the patients who had been explored for protruded intervertebral disc during the years 1938 through 1946, inclusive, and was answered by 117. One of the questions asked was whether the patient thought he was completely cured, 75 percent better, 50 percent better, 25 percent better, the same as before the operation, or worse than before operation. Chart I gives the results of the answers.

Chart I



In the questionnaire it was also asked whether the patient had been able to go back to the same type of work or work equally as arduous as he had been doing prior to the onset of symptoms, whether he had returned to work but was doing lighter work, or whether he was unable to work. Of the 117 patients, 95 (81.2 percent) had returned to the same work, 10 (8.55 percent) had returned to lighter work, 9 (7.69 percent) were unable to work because of symptoms, and 3 (2.56 percent) were not working because of other reasons. Of the 105 patients who are working after operation, there are 43 performing heavy labor, 35 light labor, 13 housework, 8 office work, and 6 are farming.

The authors realize that the questionnaires returned by the 117 patients might not represent a true picture of the results, so they sought further information by obtaining permission to examine the records of the insurance carriers in the compensation cases. It was possible to examine the records of 88 compensation case patients who had been operated upon from one to 10 years previously. The average number of working days lost was 356.5 per patient.

The total number of working days lost is figured to the day the insured's claim is closed. The patient might not start back to work as soon as his claim is closed, but the claim is not closed until the case has become stationary and it is deemed by medical examiners that the claimant (1) is permanently totally disabled, (2) is partially disabled but can return to some type of work, or (3) has recovered completely from the symptoms caused by the protruded intervertebral disc. The average cost, $3,188.75 per patient, to the insurance carrier includes (1) the medical costs in the form of hospital, drug, transportation, nurse, and doctor bills, (2) compensation paid while the patient is being treated, and (3) final compensation award. Three patients were considered unable to do any type of work again and, therefore, were awarded permanent total disability; in two of these cases, the patients had had their backs operated upon once before. Eight patients were considered completely cured as far as their protruded discs were concerned, and 77 were given some degree of permanent partial disability. The average permanent partial disability award was $1,015.40.

In the 160 patients in whom the end-results of operation were evaluated, the results have been classified as excellent, good, or poor. An excellent result means that the patient is satisfied, that he is back at his former occupation or performing some duty equally as arduous as the work he had done before the onset of symptoms, and that he is having little or no discomfort. A good result means that the patient is working but is not performing as heavy labor as he had done before the onset of symptoms, and that he is having some pain and might, at times, have to stop work to give his back a rest. A poor result means that the patient is able to do little or no work and he feels that he is no better or is worse than before operation. This study of the results in 160 patients revealed that 98 (61.25 percent) had excellent results, 46 (28.75 percent) had good results, and 16 (10 percent) had poor results.

An attempt was made to determine whether there were any factors that might influence the appraisal of the result. The condition found at operation was studied and correlated with the end result. It was noted that an excellent or good result is much more likely to follow when a protruded intervertebral disc is found and removed than when there is a negative exploration or when an inflamed nerve root, adhesions about the root, or some other pathological condition is present. It is the general impression that private patients report better results than compensation patients, and the authors' experience bears out this impression. The results in the compensation and private patients are compared in the table below:

Results in compensation and private patients

Type of Case	Number of Patients	Results		
		Excellent	Good	Poor
Compensation	108	57 (52.8%)	35 (32.4%)	16 (14.8%)
Private	52	40 (76.9%)	10 (19.2%)	2 (3.9%)
	160			

Concerning the much debated question whether a spinal fusion should routinely accompany the removal of a protruded intervertebral disc, the authors employ fusion when it seems indicated and conclude from the results that it is not necessary to do a fusion in every patient from whom a protruded disc is removed in order to obtain a good result. Many of the patients who have not had fusions are back at hard labor. If the patient has had a great deal of back pain, if the roentgenogram shows a spondylolisthesis, a lateral defect in the neural arch, an inequality of the angle of articulation of the facets on the two sides, or any other evidence of instability, then a fusion should be done, especially if the patient is young and active. Also the authors are inclined to do a spinal fusion when at the time of surgery an instability of the 4th or 5th lumbar vertebra is discovered or when there is a negative exploration for protruded disc. The authors are of the opinion that the best results occur in those cases in which there is close cooperation between the neurosurgeon and the orthopedist. Eighty-five (37.9 percent) of the 224 patients in this series had spinal fusions at the same time the exploration for the protruded disc was carried out.

From a compensation standpoint a spinal fusion patient loses more days from work and has to be closed at a higher permanent partial disability rating than one who does not have a fusion. However, as already stated, a fusion was done when it seemed indicated and it would be impossible to state the cost had it not been done. (J. Neurosurg., March '49, J. Raaf and G. Berglund)

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Some Observations Resulting from Routine Neurologic Examinations on Lobotomized Patients: Between October 1943 and October 1947, 360 patients were subjected to prefrontal lobotomy at the Boston Psychopathic Hospital. The majority of cases were classified as schizophrenia, but the group included affective disorders, unclassified psychoses, obsessive compulsive states and a number of organic psychoses. Four patients were lobotomized because of chronic invalidism accompanying intractable pain. The operations were performed by either Dr. James L. Poppen or Dr. Kenneth E. Livingston with the assistance of other members of the neurosurgical staff of the Lahey Clinic. All operations were performed under intravenous sodium pentothal anesthesia supplemented with local novocaine, except for 4 which were performed under local novocaine alone. The operative procedure, carried out through frontal trephine openings 3 cm. anterior to the coronal suture and 3 cm. lateral to the midline, is designed to transect the white matter from the center of the trephine opening to the gray matter of the orbital surface of the frontal lobe in a plane just anterior to the tip of the anterior horn of the lateral ventricle. Medial and lateral white matter, as well as the central core, is severed as completely as possible.

The observations presented are based upon repeated examinations of approximately 100 patients during their hospitalization. Many of these, and others which had not been specially examined while in the hospital, were seen at the time of their return for check-up examinations.

Routine examinations of lobotomized patients show no evidence of interruption of pathways for volitional movement, coordination of movements, or sensory perception. Babinski signs and ankle clonus, which are present in the first few hours after operation, are interpreted as being the result of pentothal anesthesia because they disappear in from 6 to 12 hours and were not present in 2 patients on whom the operation was performed under local novocaine anesthesia. All patients have a period of varying length and intensity of a peculiar state of lethargy. There is considerable reduction in muscular tone for a few days, but tone improves as alertness returns. During the phase of postoperative inactivity there is an almost universal finding of an excessive reaction of withdrawal and of protection as a result of the application of painful stimuli to the skin. This over-reaction is most clearly obtained from a stimulus of pin prick on the plantar surface of the foot. All patients show a lack of control of the urinary bladder during the first week or more after operation, although at all times they apparently are aware of the need to void. During the period of postoperative inactivity it is difficult to obtain and hold the patients' attention and little can be learned of the mental content. Yet in spite of the appearance of drowsiness and poverty of mental content, the patient may be galvanized immediately into temporary alertness and action by pin prick on the plantar surface of the foot.

These observations of altered behavior after operation indicate that lobotomy interrupts, for a time at least, the mechanism of automatic higher center control

over certain basic reflex patterns. A noxious stimulus, especially to the sole, sets in motion the reaction of withdrawal and protection. Nerve impulses from the urinary bladder set in motion the motor activity of emptying. With training and experience the normal individual in his development obtains automatic control over these spinal reflexes. The lobotomized patient perceives and recognizes the nature of the stimuli but apparently does not possess the power to restrain or to inhibit the motor response. With the passage of time almost all patients are able, with help, to regain the capacity of control of the bladder. A pain stimulus applied to the sole of the foot of all individuals induces simultaneously the perception of the stimulus and the protective reflex of withdrawal. The average normal adult integrates the stimulus into his awareness of the situation and when the stimulus is a part of a medical examination the reaction of withdrawal of the affected limb may be completely inhibited. This inhibition of the basic reflex of withdrawal in the average adult is automatic, yet variable in degree, depending on the circumstances at the moment of the stimulus. There might be a capacity in the lobotomized patient to regain control of the reaction of withdrawal if retraining efforts were undertaken. No one can thoughtfully examine these patients with regard to their wetting and reaction to pin prick without being impressed with the similarity of their reactions to those of a normal child between the ages of two and six.

The excessive reaction to superficial pain in lobotomized patients is of interest when it is considered that the operation has been accepted as a means of therapy for some patients with intractable pain. Evidently the misery which accompanies chronic pain of, for example, metastases of cancer in bone, is subserved by a different neurophysiologic mechanism than that of a sudden pain from the body surfaces.

An explanation of the period of reduced spontaneous movements and poverty of mental activity is more difficult. It is possible that the physical effects of brain trauma may play some role. The rise in spinal fluid pressure generally comes afterward, but pleocytosis is usually present. However, the suddenness with which the patient may be activated by pain suggests that the reduced activity within the central nervous system is not due to fixed physical disorder and requires explanation. One concept of central nervous system activity is that it results from constellations of nerve impulses reverberating in circuits between all parts and portions of the brain, each interdependent upon the other. Bilateral complete lobotomy may, therefore, remove temporarily an important part of the system which normally assists in sustaining the reverberating activity. (J. Nerv. and Ment. Dis., March '49, A. S. Rose)

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Hiatus Hernia: Hiatus hernia is a far more frequent condition than has been generally accepted. It is often overlooked, and the patients with it are treated for peptic ulcers, disease of the gallbladder or coronary heart

disease. Of course, the same patient may have any of these latter conditions along with a hiatus hernia.

A thorough history will indicate definite symptoms suggestive of a hiatus hernia to the physician who is alert concerning this condition as a diagnostic possibility. It occurs most frequently after 50 years of age, and it has been reported to be more frequent in females than in males. The commonest symptom is pain, usually under the lower half of the sternum or in the epigastrium. It may be referred to the back or up into the left shoulder and arm. It may be excruciating or described as a lump under the lower part of the sternum, pressure or a burning sensation. It occurs most frequently after heavy meals, especially if followed by stooping, lifting, lying down or rising up in bed or by anything that increases intra-abdominal pressure. The duration of the pain will depend on whether it is a sliding type of hernia or a fixed one or if it is complicated by an ulcer in the pouch, in which case it will be similar to the characteristic pain of any peptic ulcer. Relief of pain on assumption of the upright position is characteristic of the sliding type of hernia. Dysphagia may be the first symptom experienced by the patient. Hot or cold foods or liquids, as well as roughage, may cause painful swallowing.

Symptoms referable to the heart are common and lead to the diagnosis of heart disease. Hemorrhage occurs in hernias complicated by peptic ulcer in the pouch or from an associated ulcer in the stomach or duodenum. Symptoms referable to the other conditions occasionally associated with hiatus hernia may overshadow those referable to the hernia itself. The hernia is frequently overlooked until the symptoms of the associated condition are removed, as in excision of a gallbladder with stones, and one has to continue the search for a cause of the persisting pain.

A correct diagnosis can be made only by a roentgenologic examination. Some roentgenologists prefer the supine position at the time barium is swallowed, with rotation of the patient from side to side. The authors have been more successful when the Trendelenburg position has been used. Generally, the hernia is overlooked if the entire examination is made in the upright position, even though the patient be examined later in the supine position.

Case histories of several of the authors' patients follow:

A farmer, aged 40, complained of epigastric pain for one month. When cranking a tractor, he strained himself and had sudden gnawing epigastric pain. He was taken to a hospital for observation. Two conventional series of gastro-intestinal roentgenograms were normal. He was released after several days, on a liquid diet. He continued to have intermittent pain.

Physical examination showed the patient to be stocky, with a weight of 177 pounds. The roentgenogram of the upper part of the gastro-intestinal tract showed hiatus hernia. He was placed on a weight-reduction diet.

An automobile mechanic, aged 47, complained of burning pain present for two years near the right sternal border, produced by pulling on a wrench when he was in a cramped position. The pain

occurred at times when he lay down. This man had been under treatment for coronary insufficiency for two years without relief of symptoms.

The patient was obese, with a weight of 182 and 1/2 pounds. His blood pressure was 146/88. The electrocardiogram was normal. A roentgenogram of the upper part of the gastro-intestinal tract revealed hiatus hernia. He was placed on a weight-reduction diet.

A man, aged 54, weighed 170 pounds. On 7 February 1942, he was awakened at about 3 a.m. with excruciating pain in the epigastrium, approximately eight hours after eating popcorn. At 6 a.m. he was seen by a physician, who suspected a coronary occlusion. Intravenous administration of aminophylline gave no relief. Morphine, 0.5 grain, was required for relief. The pain returned in six hours, again requiring morphine. Physical examination was noncontributory. An electrocardiogram and a roentgenogram of the gastro-intestinal tract, made in the upright position, were normal. The genito-urinary tract and the gallbladder were normal on roentgenograms, except that the gallbladder was slow in emptying. The patient had no recurrence of pain until January 1948. After eating breakfast he stooped over from a standing position to tie his shoe and experienced a severe pain in the epigastrium and shortness of breath. Both subsided after he got into his car. One hour later, while walking briskly in the cold air, he was seized with a pain in his chest and left arm. The pain subsided after he sat down. An electrocardiogram and a roentgenogram of his chest were normal. He continued to have the same pain each time he climbed stairs or walked in the open. Physical examination was essentially noncontributory. Laboratory examination revealed nothing abnormal except for a hemoglobin content of 17.15 Gm. and 5,790,000 red blood cells. An electrocardiogram showed posterior myocardial infarction. A roentgenogram of the gastro-intestinal tract in the Trendelenburg position revealed a sliding type of hiatus hernia. The patient was treated for the myocardial infarction and for overweight, with satisfactory results to date.

A manufacturer, aged 47, on 20 October 1947, gave as his chief complaint pain beneath the xiphoid for three months. The onset of epigastric pain had occurred three months previously, and it had lasted almost steadily for two days, with no associated symptoms. Since the onset the pain had returned with exertion and when the patient lay flat in bed. It was relieved by rest. The patient was obese, with a weight of 218 pounds (99 Kg.). The blood pressure was 120 systolic and 78 diastolic. Otherwise the findings on physical examination were normal. The roentgenogram of the gallbladder was normal. A roentgenogram of the upper part of the gastro-intestinal tract revealed a hiatus hernia. The electrocardiogram was normal. The problem was to differentiate epigastric pain caused by a hiatus hernia in an obese man from that of coronary insufficiency. An exercise test was done, which resulted in an abnormal electrocardiogram and brought on epigastric pain which was not relieved by oxygen and vasodilators. Later cardiograms were typical of anteroseptal infarct. The patient was hospitalized and treated for a myocardial infarction and given a weight-reduction diet. Recurrence of epigastric pain was frequent unless he slept in a semireclining posture. He was last seen on 20 May 1948, had lost 27 pounds, and was entirely free of pain.

A salesman, aged 53, on 19 September 1947, presented the chief complaint of pain in the chest for nine years. He was kicked in the abdomen in 1920 and had vague epigastric pain intermittently until 1939, when he had severe epigastric and substernal pain which was diagnosed as myocardial infarction. He was hospitalized for three months and then stayed in bed nine more months. The pain continued intermittently while the patient was at bed rest and afterward. He was incapacitated because of anginal syndrome. His weight was 160 pounds. The blood pressure was 136 systolic and 84 diastolic. He was of stocky build. The roentgenogram of the chest was normal, as was the electrocardiogram made after stair climbing. The anoxia test showed vasomotor collapse at nine minutes but no electrocardiographic changes. A roentgenogram showed hiatus hernia. A weight-reduction diet of bland foods and the administration of antispasmodics and alkalis gave no results. The patient asked for surgical treatment. Block of the phrenic nerve (left) with procaine hydrochloride relieved the pain; hence, the phrenic nerve was crushed, which gave complete relief, according to the patient when he was last seen.

Twenty-four cases of hiatus hernia have been observed at the Salt Lake Clinic in the last eighteen months. This was more than were found in the previous thirty years. The age ranged between 33 and 68 years, with three patients under 45. Seventeen patients were men, and 7 were women. Sixteen

of the 24 patients were overweight. Twenty-three patients complained of either epigastric or substernal pain; 7 of these had radiation of the pain into the left shoulder or arm. Only one had dysphagia. Two patients had gastro-intestinal hemorrhages with anemia. The duration of symptoms was from six months to twenty years; the average duration was five and one-third years.

Seven patients had been treated for coronary heart disease, 5 had been treated for disease of the gallbladder, 7 had been treated for peptic ulcer and 7 had received no definite form of treatment. (Four patients had received treatment for both disease of the gallbladder and peptic ulcer or disease of the gallbladder and coronary heart disease.)

The authors point out that whereas the frequency of occurrence of hiatus hernia as reported in recent medical literature varies from 0.6 percent to as high as over 12 percent in routine roentgenologic studies of the gastro-intestinal tract, it must be looked for by special technic if it is to be found more than occasionally. Hiatus hernia must be kept in mind in any case of atypical angina pectoris, duodenal ulcer, dysphagia, disease of the gallbladder, anemia from gastro-intestinal bleeding or obscure upper abdominal pain or pain in the lower part of the chest which might be associated with increased intra-abdominal pressure. (Arch. Surg., April '49, G. G. Richards and K. A. Crockett)

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Incidence of Hiatus Hernia and Associated Lesions Diagnosed by Roentgen Ray: It was some years after the advent of diagnostic roentgenology that appreciation of the diagnostic value of changes in position of patients during barium study of the gastro-intestinal tract led to routine study of the patient in the prone, supine, or Trendelenburg positions. Ritvo in 1930 emphasized the importance of this maneuver in bringing to light many previously undiagnosed hernias at the esophageal hiatus, particularly of the recurrent, small variety which may be seen only in the Trendelenburg position and may, indeed, be absent at another examination. Jenkinson and Roberts estimated that only 5 percent of hiatus hernias could be diagnosed if the erect position alone were used during examination.

An analysis was made of the reports of all barium studies of the upper gastro-intestinal tract done in the Radiology Department in 1945 and 1946, at the Boston City Hospital where study of the patient lying down or in the Trendelenburg position is done routinely.

Among 3,448 patients examined in the two-year period there were found 308 esophageal hiatus hernias, an incidence rate of 8.93 percent. This was the second most frequent lesion diagnosed, duodenal ulcer having been found in 20.41 percent of the patients. It was more than twice as frequent as gastric ulcer or gastric carcinoma. Although the frequency of diagnosis in this series

is higher than in most previously reported, some authors have also found a similar incidence.

Harrington, on examination of the esophageal hiatus routinely in the course of 1,000 consecutive abdominal operations, found that in 55 percent of the patients the hiatus closely approximated the lower end of the esophagus, in 35 percent one finger could be inserted between the esophagus and the margins of the esophageal hiatus, in 8 percent two fingers could be inserted, and in 2 percent from two to three fingers. In these last two groups herniation was thought to be potentially possible.

In this series, as in other series, women predominate, but by a much smaller margin than is usually reported, and the majority of patients are in from the sixth to eighth decades of life. In the present study, such age groups accounted for 76.61 percent of the cases. That the occurrence in the older age groups is not accounted for on the basis of the presence of a disporportion of elderly persons in this series is attested to by the frequency of diagnosis in this study of duodenal ulcer, a disease not restricted to the elderly.

Age undoubtedly is of etiologic importance. Degenerative changes resulting in a loss of elasticity of the hiatal tissues contribute to the formation of the hernia. Abnormal stress, such as would occur in frequent episodes of coughing, retching or vomiting, could also stretch and possibly tear the tissues of the hiatal orifice. Increased intra-abdominal pressure from any cause is also a frequent factor in inducing changes at the esophageal hiatus. Obesity, large abdominal tumors or ascites may be contributing factors in this regard. Childbearing has a definite relationship to the development of hiatus hernia. Among 195 women in the third trimester of pregnancy, Rigler and Eneboe found hiatal hernias in 18 percent of 116 multiparas and in 5 percent of 79 primiparas. In only 3 of 10 of these women with hiatus hernia examined from one to 18 months post partum was the hernia again found. Schnepp and Evans and Bouslog have found hiatus hernia to explain some cases of intractable heartburn of pregnancy.

Many authors have proposed that hiatus hernia is primarily a congenital defect. In cases in which it occurs in infancy and usually involves the presence of a greater part of the stomach, usually with other viscera, in the thoracic cavity, it is a congenital lesion. This is probably true also when it appears in adults in whom there is a short esophagus, with over a third of the stomach intrathoracically situated. In the majority of cases, however, it seems rather unlikely for a congenital lesion to appear so frequently at the advanced ages at which hiatus hernia is found.

In this study, 223 lesions were described by the radiologist as small, 68 as moderate and only 17 as large (over a third of the stomach in the thorax).

Thirty-nine of the 308 lesions were described as being of the shortened esophagus type. Of this group of hiatus hernias, 25 percent were accompanied by conditions which in themselves may have been responsible for, or potentially causative factors of, the clinical picture. The occurrence of 31 duodenal ulcers represents an incidence rate of 10 percent in cases of hiatus hernia, as contrasted to 20.41 percent in the whole group. There were 5 patients in whom an ulcer niche or crater was noted within the herniated portion.

Although there were no esophageal ulcers noted in this series, it is of interest that Dick and Hurst were of the opinion that chronic esophageal ulcer rarely occurs without the presence of a hiatus hernia of the congenitally short esophagus type. Particularly with the short esophagus type, there is loss of the normal valvular mechanism at the cardia, which allows regurgitation of stomach contents into the esophagus, especially when the patient is lying down. The acid stomach content thus aids in formation of the esophageal ulcer. Johnstone felt that a hiatus hernia was invariably present, being found in 20 of his 21 patients with esophageal ulcer. However, he strongly dissented to the proposed idea that the shortened esophagus was of a congenital nature. Rather, the esophagus may become shortened because of fibrosis and healing of the ulcer; in other words, there is an acquired shortening of the esophagus. This explains the old age of the groups involved better than the postulation of a basic congenital lesion. Dick and Hurst objected to this on the basis that if sufficient cicatrization occurs to shorten the esophagus and pull the stomach into the thorax it might be expected to cause esophageal stenosis, which apparently had not occurred in their experience. Interesting on this point is Benedict's thorough study of 44 cases of benign esophageal nontraumatic stricture, in which series a hiatus hernia was present in 17, or 38 percent.

Wilkinson reported 6 duodenal ulcers in 70 cases of hiatus hernia, and Polley found 4 duodenal ulcers in 47 cases. Jakelson and Morein stated that ulcer of the stomach and duodenum accompanied hiatus hernia in 25 percent of the cases. The findings in the present series are fairly consistent with the other reports. Weintraub and Tuggle found that in 310 patients with a diverticulum of the duodenum, 9 percent of the patients had an associated hiatus hernia. Conversely, Polley found that in 10 percent of 47 patients with hiatus hernia a duodenal diverticulum was present. This compares with an incidence of 5 percent in this series. Diverticulosis of the colon occurred in 34 percent of Polley's patients and in 23 percent of Wilkinson's 70 patients with hiatus hernia. Although not studied in the present series, it is interesting to note that either roentgenologic or histologic evidence of chronic cholecystitis and cholelithiasis occurred in 14 percent of Wilkinson's patients, in 15 percent of Polley's and in 17 percent of Jones'.

The foregoing data serve to indicate the degree of frequency with which associated gastro-intestinal lesions occur in cases of hernia at the esophageal

hiatus. The clinical importance of such findings is that other abnormalities should be searched for and ruled out before symptoms are ascribed to a hiatus hernia. In a study of 50 patients with hiatus hernia, Radloff and King found one or more concomitant diseases in 69 percent, the correction of which often afforded symptomatic relief.

There is little doubt that hiatus hernias, regardless of size, may be completely asymptomatic and may be demonstrated accidentally. This is the case in many instances in which accompanying lesions cause the symptoms. However, it is difficult to determine from the literature exactly how frequently hernias occur without symptoms. Wilkinson stated that in only 4 of his 70 cases were there no symptoms that could possibly be related to the hiatus hernia. Moersch found that all but 19 of 246 patients with a hiatus hernia had symptoms directly attributable to the hernia. On the other hand, Root and Pritchett stated that 19 of 31 patients with hiatus hernia had no symptoms referable to the hernia, but there were 14 associated gastro-intestinal lesions in the asymptomatic group.

The author has not been able to find in the literature a study of a sizable group of patients without gastro-intestinal symptoms in the age range of from 50 to 70 in which roentgenologic examination for hiatus hernia specifically was undertaken. Such a report is required so that some idea of a control can be obtained to contrast with the available reports which are usually concerned with patients presenting symptoms of such a nature that roentgen examination of the gastro-intestinal tract is indicated. From the clinical point of view, the question of whether the presenting lesion is congenital or acquired is of no importance. The size of the hiatus hernia is also of little importance. This is stressed by Harrington and Jones, who pointed out that many of the symptoms occurred most frequently in patients with the smallest hernias.

There may be various combinations of symptoms, but in many cases one type of symptomatology predominates. Ritvo stated the belief that the most typical complaint was a feeling of weight or pressure under the xiphoid process, which comes on during or soon after meals and is relieved by taking a hot drink or by walking about for a few minutes. Jones, in studying 45 patients with small hernias, found, as have others, that factors which may either precipitate or aggravate symptoms are exertion, emotional tension, the intake of excessive food and lying down. Somewhat typical is the tendency for symptoms to occur in attacks intermittently with periods of complete freedom. The physical examination is of little value in diagnosis. Methods of obtaining symptomatic relief varied and included assumption of the upright position, vomiting, belching, the use of antacids and the use of atropine and nitroglycerin.

It is apparent that there is no particular pattern which the symptoms of hiatus hernia assume. Rather, its manifestations group themselves into syndromes

which may in an individual case simulate esophageal, gastric or duodenal, cholecystic and coronary artery disease as well as gastro-intestinal bleeding and anemia of undetermined cause; this gives a good idea of the differential diagnostic problem.

In this study of roentgenologic findings in association with hiatus hernia, there was a diagnosis of another condition also present in one of every 4 cases. Clinical study would no doubt reveal that the hiatus hernia was a coincidental finding as regards the explanation of symptoms in some of these cases. On the other hand, the hiatus hernia should not be overlooked as a potential source of symptoms just because another gastro-intestinal lesion is present. Obviously, too, some of the associated lesions, such as duodenal and jejunal diverticula, are thought of as usually, but not always, being nonsymptomatic. There is no easy method of determining, in the presence of such combinations, which lesion is productive of the patient's symptoms, because either lesion alone may produce them. Observation and careful attention to the clinical course under treatment will usually uncover the answer to this perplexing problem. (Arch. Surg., April '49, I. B. Brick)

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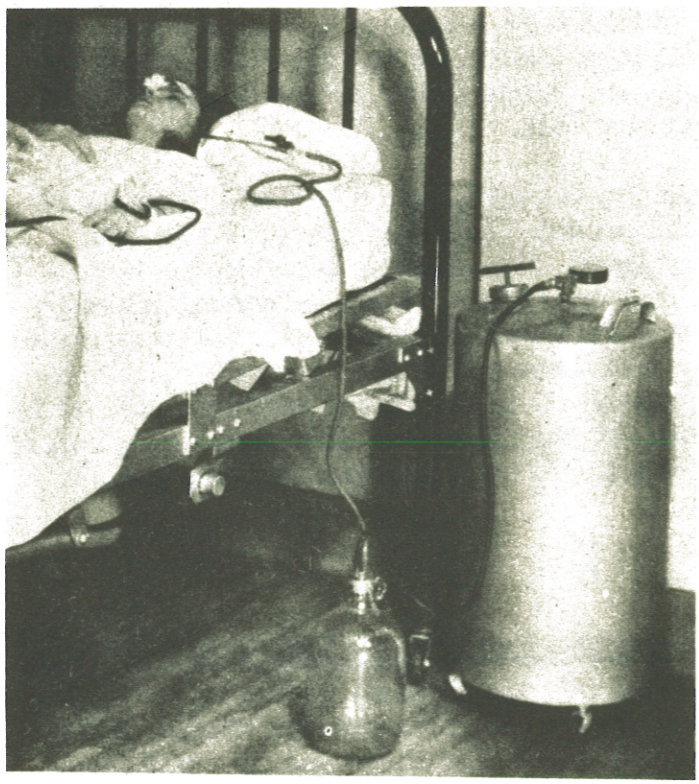
A New, Safe, Simple Apparatus for Obtaining Negative Suction for the Patient with an Indwelling Gastro-Intestinal Tube: At the University of Minnesota Hospitals, until recently, three-bottle suction has been preferred to the exclusion of all other mechanical appliances for the patient with an indwelling tube in the gastro-intestinal canal.

Because of the inconvenience of transporting and storing three-bottle sets, the difficulty of maintenance and assemblage of a satisfactory set without leaks, the inherent danger to the patient when assembled incorrectly, and the expense involved, one of the authors devised a new apparatus as shown on the following page which has proved so satisfactory and simple that it is gradually supplanting the three-bottle sets.

The apparatus consists mainly of a hollow tank with a crown top and inverted bottom. This steel cylinder measures 15 and 3/4 inches in diameter by 24 inches in height. It is made of 14 gauge steel of welded construction throughout. It is supported by four Faultless casters with a load rating of 200 pounds. The tank itself weighs approximately 40 pounds. Secured in the crown top is a suitable handle for moving the piece, a negative pressure gauge graduated in inches of mercury, and a single orifice needle valve. On the side opposite from the handle and recessed into the cylinder is a hand pump. A machine-surfaced flange fastens the complete pump into the crown by means of 7 machine screws. The parts of the pump are chosen with extreme care in order to embody long life and to insure a freedom from maintenance and repair. The pump cylinder is a heavy walled brass tube. The check valve at the bottom



A model now is available which is lower and may be placed under the bed.

of the pump cylinder is made of oilproof of neoprene. The pump leather has been specially designed. It is fastened in such a manner to the bottom of the pump rod, that it never can become loose or unscrewed. The complete pump assembly can be readily removed in case attention is necessary. In the event of an inadvertent overflow of the aspirated material into the tank, because of a failure to empty the catch bottle, the removal of the pump assembly affords an adequate 2-inch opening for washing and emptying the interior of the cylinder. Between the handle and the pump in the center of the crown is the negative pressure gauge. In juxtaposition to this gauge is a conduit to which is connected the rubber tubing which connects to the catch bottle and then to the patient. All fittings are constructed of satin chrome plated brass. The steel tank is bonderized (rust proofed) inside and out. The synthetic lacquer finish (hammered aluminum) is baked for durability.

With the needle valve closed about from 25 to 30 light, slow strokes of the pump handle will evacuate the steel tank and the gauge will then show approximately five inches of negative mercury pressure. After the nasal tube is connected to the catch bottle, the needle valve is opened. The drainage bottle is immediately evacuated as well as the nasal tube. The suction to the drainage bottle and thence to the patient is never interrupted, even while evacuating the tank. The capacity of the steel tank as a reservoir of negative pressure, the same having been built up by from 20 to 30 strokes of the pump, this quantity is sufficient to drain approximately four gallons of liquid and/or air from the patient. Consequently, it is necessary to change the gallon drainage bottle periodically. Ordinarily, this lasts the average patient from 24 to 30 hours.

This device is foolproof. Because of the construction of the machine, it is impossible to create a positive pressure, therefore avoiding the danger of insufflating the stomach with air. In addition, because of the absence of water

in the suction system, the danger of flooding the patient is obviated also. The amount of suction can be varied and in no instance after the initial pressure is established can the negative pressure be excessive, as the supply of negative suction decreases as the apparatus functions.

The bedside care of the appliance is negligible. The replenishment of negative pressure is easy. The tank occupies minimal space, and in this manner allows easy access to the patient. The machine is easily portable and may serve a number of patients at one time utilizing individual drainage bottles. The expense of maintenance, replacement, washing, and the storage of bottles and tube as is necessary with three-bottle sets is practically non-existent. It is considered that the saving (1) in the cost of maintenance, (2) in nursing care, and (3) in repairs with this appliance far outweighs any advantages of the three-bottle suction sets or electrical contrivances. (Surgery, April '49, K. A. Merendino and J. A. Phelan)

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Sudden and Complete Decompression Versus Slow Emptying of the Distended Urinary Bladder: In 1931, Brecher and Chwalla of Vienna recognized the fallacy in the belief that the chronically distended bladder should not be emptied abruptly, but slowly and gradually. Within three and one-half years they treated more than 300 patients with distended bladders by sudden and complete emptying and then inserted an indwelling catheter. The author has since then treated all his patients, regardless of the volume of urine, in the same manner, and during these 16 years he has never seen a complication which he could have attributed to sudden emptying. He states that he has treated hundreds of patients. Some have had enormously distended bladders or severe edema of the legs due to compression of the blood vessels by the overly distended bladder. One of his first patients treated by sudden decompression was a man of 70 with diabetes, whose bladder yielded over 3000 cc. urine. On account of the severely impaired kidney function, the patient was subsequently submitted to prostatectomy in two stages. No complications whatever occurred.

Apart from Brecher and Chwalla, the author only knows of Seifert who reported 126 patients treated in the same way and with good results.

There are serious drawbacks to the old method of slow decompression. Most of the patients with chronic vesical distention come with advanced renal insufficiency and urosepticemia. For such patients immediate action is the course for a quick return to normal renal metabolism. The extreme dehydrated condition of the whole organism requires urgent replenishing. Not only the body tissues are in need of water, but also the badly damaged kidney. Kidney function must be restored as quickly as possible by ingestion of large amounts of water to insure the elimination of the nonprotein nitrogen and other metabolites.

Because the patient cannot start with a large intake of fluid until the bladder has been emptied, slow decompression will cause a delay which may be fatal.

Frequent catheterization or the indwelling catheter will eventually produce urinary infection and subsequent ascending infection. The only therapy against this imminent danger is the immediate onset of a downward flow of urine. Immediate action should be taken to produce abundant urinary secretion. Therefore, sudden decompression enables the patient to start at once with a large fluid intake.

Sudden decompression of the bladder may indeed bring on those fatal complications feared by our predecessors unless certain rules are followed which will render the proceedings entirely free of danger. The one outstanding principle is that once the bladder has been emptied by sudden decompression it has to remain empty. Nothing must interfere with the free escape of urine for a single moment for a period of at least one week.

Bladders with a retention of even more than 1000 cc. completely lose their elasticity after decompression. Their capacity sinks to almost nothing as has been proven by Rose's manometric experiments. Further evidence of a small bladder capacity is also found in the pains arising from even small quantities of water injected into the bladder, and the fact that the fluid is immediately expelled around the catheter. Therefore, if the bladder does not remain completely drained at all times, back pressure toward the kidney may develop at any moment, because the bladder has lost its dilating power. Even when no reflux takes place, stagnation and pressure in the ureter and pelvis may reach a point at which further secretion by the kidney will be impossible. Because Bumpus has seen such a reflux in only from 4 to 6 percent of his patients, it must be admitted that a free passage between the bladder, ureter and pelvis does not always exist. He carried out his x-ray examinations on chronically ill patients only, in whom the bladder elasticity had been already restored. The author believes that in acute cases such a free passage actually occurs far more often than can be concluded from his observations.

There is no doubt that such a back pressure will severely damage the renal parenchyma either through distention or through ascending renal infection, and will bring on such feared accidents as renal hemorrhages, oliguria, pyelonephritis, anuria and septicemia. Creevy reported that of 71 patients who died after catheterization in the presence of residual urine, death was due to renal infection in all but 5. So all the old observations concerning the fatal consequences of sudden decompression were correct, but not the understanding of the real cause.

Sixteen years of experience with sudden decompression have established the following method of treatment: when a patient comes for treatment of a chronically distended bladder, he is never catheterized in the office or at his home but always in the hospital where, under supervision of a doctor or a well

trained nurse, all the necessary measures will be taken to insure continuous drainage of the bladder after decompression. If possible, before emptying the bladder, bilateral vasectomy is performed in order to prevent epididymitis. Then a Tieman catheter, No. 17 or 18, is inserted into the bladder and kept in place with adhesive tape. A small glass tube connects the indwelling catheter with a long rubber tube dipping into a bottle standing on the floor beneath the bed. The indwelling catheter should never be put directly into a urinal between the legs as this does not insure asepsis and favors decomposition of the urine and crystallization through open air contact. The bottle on the floor contains an antiseptic solution. The lower end of the long rubber tube is fastened onto a glass tube dipping into the antiseptic solution. Thus a permanent slight suction is achieved and there will be no direct contact with air.

During the first 24 hours as much water as possible is given to the patient. The higher the patient's nonprotein nitrogen, the more water he will want. A minimum of from 3000 to 4000 cc. output should be attained, but the author has had patients with from 6000 to 7000 cc. output. The higher the output of urine the quicker will be the improvement in the patient's condition. Thirst subsides and the nonprotein nitrogen sinks rapidly. If the patient cannot consume enough fluid orally, physiological salt solution mixed with glucose has to be given subcutaneously, by rectal drip enema, or in very bad cases with uremia and vomiting, by venoclysis. Immediately after decompression the author has never seen a dangerous sinking of the blood pressure, however, later a close watch of the condition of the heart must be made because of the strain occasioned by the excessive water intake.

If no obstruction, such as small blood clots or shifting of the catheter, hinders the free escape of urine, bladder washings should be avoided. The well established drainage system should not be disturbed for the first from 5 to 7 days. In this way the highest possible standard of sterility is maintained. After this lapse of time the renal function is usually so much improved that treatment with sulfa drugs can be started.

During the first few days following decompression, blood is sometimes found in the urine, but no serious hemorrhages take place. Submucous hemorrhages of the bladder sometimes occur. They may be generalized, when they are due to the spastic contractions of the detrusor muscle, or localized in the area abraded by the tip of the indwelling catheter. Sometimes small blood clots obstruct the catheter so that a constant watch of the outflow of urine must be maintained. The author has never seen hemorrhages demanding aspiration of blood clots.

Creevy reports hemorrhages in 53.8 percent of 26 patients treated by sudden decompression and 48.5 percent in 33 patients in whom emptying was carried out gradually, so that the percentages are practically the same.

Several patients with bladders containing between from 7000 to 14000 cc. have been treated by sudden decompression, and in none of them did subsequent hemorrhages develop.

Because the author believes that all hemorrhages after decompression are submucous bleedings, he prescribes 0.15 Gm. papaverin hydrochloride suppositories from 3 to 4 times a day, in order to relax the bladder muscle as quickly as possible. Usually hemorrhage stops very soon. If the patient seems unable to endure the catheter, the author does not hesitate to give him morphine or any other sedative during the first few days.

For patients on whom a cystotomy is necessary the procedure is exactly the same. The typical suprapubic operation is usually not carried out for such patients, but the puncture method with a trocar according to the technic of Pflaumer (Nurnberg) is preferred. This method saves the patient a lot of preoperative anxiety and operative shock, because it can be carried out within a few minutes on any ordinary office table. Moreover, the fistula will heal by itself in a few days after the suprapubic catheter has been removed following prostatic resection. (J. Urol., March '49, T. Hryntschak, Dept. Urol., Stadische Poliklinik, Vienna, Austria)

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Intravenous Procaine: The intravenous injection of procaine was long regarded as an accident to be avoided, but it has now become evident that comparatively large amounts of procaine injected intravenously can be tolerated by man provided the injection is made slowly.

Procaine, which is diethylaminoethyl-p-aminobenzoate, belongs to the alkamine ester group of compounds. These compounds all have a similar basic structure, by variation of which their main action resembles that of atropine, curare, an antihistaminic, or a local anesthetic. In addition to the main action they may show several of the other effects to a lesser degree. Some, like benadryl, anthisan, and antistin are potent antihistaminics, although possessing atropine-like and local anesthetic properties at the same time. Others, like procaine, have, besides their local anesthetic action, atropine-like, curare-like, and probably antihistaminic effects as well.

Procaine and the other local anesthetics among these esters are now known to have a quinidine-like action on the auricle of the heart, which probably explains the efficacy of procaine in stopping fibrillation and other cardiac arrhythmias. The antihistaminic action probably accounts for its striking effect in urticaria and other allergic manifestations, and many of procaine's properties may be the result of its antagonistic action to acetylcholine, for conduction in the heart muscle resembles that in sensory nerves, and Burn suggests that acetylcholine plays an important part in this conduction. Vasodilation, too,

may be the result of antagonization of acetylcholine by procaine at the synapses in the sympathetic ganglia.

Clinically, intravenous procaine has a powerful effect in relieving pain of both sympathetic and somatic origin. Procaine, when injected intravenously, concentrates from 7 to 8 times more in inflamed tissues than in normal, as a result of the increased capillary permeability in the diseased tissues responsible for the pain. The still very low concentration of procaine in these tissues during the course of this therapy would be expected to have its first effect on the nerve terminals of smallest diameter, the sympathetic fibers and those conducting pain impulses.

The types of pain for which intravenous procaine has been advocated are many and varied, some of which are: postoperative pain, both in the operation wound and that associated with chest complications; the pain incident to the dressing of burns; angina pectoris; thrombophlebitis; intermittent claudication of vascular disease; and arthritis. It has even been used as an analgesic in labor, with, in the hands of enthusiasts, good results for mother and child. The authors' experience with intravenous procaine as an analgesic is limited to its use during the dressing of burns, and for the relief of pain during the first 24 hours after abdominal operations. A high degree of relief is obtained, with a notable absence of respiratory depression. The method, however, needs constant skilled medical attention.

Since Leriche and Fontaine first described the use of procaine in vascular diseases it has been advocated for thrombophlebitis, coronary disease, pulmonary embolism, Buerger's disease, and poor peripheral circulation generally. Some writers suggest that intravenous procaine is of at least as much value as sympathetic block.

The ability of procaine to reduce the irritability of cardiac muscle has been known for many years. At one time it was applied to the surface of the heart, because its effect on arrhythmias was thought to be due to its local anesthetic action on the cardiac sympathetic nerve-endings. Procaine is in fact nearly as active as quinidine on the heart. It is of interest that amethocaine, another local anesthetic, is some ten times as active as quinidine. Burstein et al. have clearly demonstrated that arrhythmias provoked during cyclopropane anesthesia by the injection of adrenaline can be prevented or cut short by the intravenous injection of procaine, and that even after ventricular fibrillation has developed normal rhythm can be restored by the intracardiac injection of procaine. These experimental findings have been substantiated by many anesthetists. Many make a practice of giving an intravenous procaine drip throughout thoracic operations when the heart is to be handled and arrhythmias are anticipated.

Several writers describe a dramatic retrogression of symptoms and signs after intravenous procaine in serum sickness and penicillin-sensitivity reactions,

though the mode of action in these conditions was by no means clear until recently, when the close relationship between procaine and the antihistamine drugs was established. Procaine has also been advocated for asthma. The authors have experience with one case of status asthmaticus of some 24 hours' duration in which adrenaline and atropine were of no avail and the patient was exhausted and appeared in extremis, but the slow intravenous injection of 10 ml. of one percent procaine dramatically ended the attack.

Procaine is broken down in the liver into p-amino-benzoic acid and diethylamino-ethanol. This breakdown also occurs, in part, in the blood stream by the action of an enzyme. So far no significant biochemical upset in the body as a result of procaine therapy has been observed. Liver function is unimpaired.

An optimal intravenous dose of procaine gives the patient a feeling of warmth and relaxation. If this optimal dose is exceeded or administered too quickly, signs of overdose appear - pins and needles in the hands and feet, dizziness, twitching, convulsions, and ultimately loss of consciousness. Vitamin-C deficiency increases the liability to these side-effects; in fact, some advocate the addition of ascorbic acid to the procaine solution before use. Another precaution to reduce the possibility of convulsions is the previous administration of a barbiturate.

The elimination of a therapeutic dose of procaine from the blood stream occurs within 20 minutes. Therefore, if a prolonged effect is desired, the injection of procaine must be repeated frequently, or the procaine must be administered as a continuous infusion of a dilute solution. Except in emergencies, the continuous drip is most satisfactory and a dilution of 0.1 percent (one gram of procaine in 1000 ml. of normal saline) will be found convenient.

For an optimal effect from a single dose, 4 mg. per kg. of body weight, given as an infusion of a 0.1 percent solution in 20 minutes, is recommended. When a longer and less intense effect is desired the same dosage given at a slower rate suffices.

In emergencies, such as ventricular fibrillation, status asthmaticus, severe angina, or pulmonary embolism, up to 10 ml. of one percent procaine solution (100 mg.) may be given as a single intravenous injection. A careful watch should be maintained for the onset of convulsions and a syringe containing thiopentone kept handy as an antidote. (Lancet, 9 April 1949, W. W. Mushin and L. Rendell-Baker)

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Rabies Vaccine Freed of the Factor Causing Allergic Encephalitis: Post-vaccinal (rabies vaccine) encephalomyelitis in man, and its apparent counterpart,

experimental allergic encephalitis in lower animals, are conditions which occur when brain tissue is injected parenterally. The encephalomyelitis may be manifest as a paralysis of the Landry type. Pathognomonic lesions are found in the central nervous system. A consideration of the etiology of this postvaccinal encephalomyelitis had led to the hope that removal of the lipid components of brain tissue might also eliminate the material which was responsible for the paralysis. It was found that this factor which causes allergic encephalomyelitis is not removed by extraction with benzene and ether, but preliminary treatment of the vaccine with these solvents facilitates separation by subsequent treatment. The presence of calcium acetate prevents the loss of antigen when the vaccine is washed. It does not prevent removal of the encephalitic factor which appears to be water soluble. About one half of the total nitrogen of the vaccine is removed by this washing process. The technic which has resulted in antigens of high potency, yet freed of the factor which causes allergic encephalomyelitis in experimental animals may be briefly summarized as follows:

1. A suspension of infected brain in water is dried from the frozen state.

2. The dried brain is extracted with benzene followed by ether (live virus may be killed in this stage by heating in benzene).

3. After removal of the ether the dried brain is suspended in distilled water.

4. Sufficient solution of calcium acetate is added to make final concentration of M/10 calcium acetate, and the suspension is permitted to stand in the cold for an hour or two.

5. The calcium acetate solution is removed by centrifugation or filtration and the sediment is resuspended in distilled water to the original volume with agitation (clumps of sediment must be broken up).

6. The distilled water is removed by centrifugation or filtration.

7. The sediment is resuspended in distilled water or saline and homogenized. This is the washed vaccine. (Proc. Soc. Exper. Biol. and Med., March '49, J. F. Bell et al.)

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Evaluation of Certain Dangers in the Use of Jet Injection Technic: As a substitute for the hypodermic syringe, a jet injector which utilizes the principles of the Diesel fuel injector has been described by Hingson and Hughes. In the administration of substances by the hypodermic syringe, the possibility of an accidental intravenous injection is recognized. The present study was designed to investigate the possibility of a similar accidental intravenous injection with the "Hypospray" (see News Letter of 13 August 1948).

Under conditions considered very favorable for intravenous injection, in which the instrument was discharged when pressed over the jugular vein of dogs, the hypospray has lodged as much as 97 percent of the total available drug in the vein, even when administered through the skin and subcutaneous tissues. Large veins are easier to hit than small veins and retain a larger amount of the jet-injected material. The probability of unintentionally penetrating a major vessel with the jet is small but the risk is always present. Jet discharges should not be made in the neighborhood of large vessels unless the drug to be injected is safe for intravenous administration. The jet may produce macroscopically visible damage to a vessel. (Proc. Soc. Exper. Biol. and Med., March '49, R. V. Brown)

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Recent Introductions into Areas in the Central Pacific of Mosquitoes Which Serve as Vectors of Human Disease: Prior to 1941, our knowledge of the distribution of the various species of mosquitoes which serve as vectors of human disease in the Central Pacific area was very limited, but during the 5 years following 1941, U. S. Army and Navy personnel accumulated extensive records. During 1948, further surveys were carried out on Guam and Wake Island.

Aedes aegypti (Linn) and Culex quinquefasciatus Say were found on Wake Island. Prior to 24 December 1941, there were no mosquitoes on Wake. Although no mosquito-borne disease has been reported from Wake the importation of persons with dengue fever or filariasis could result in further cases as a result of local spread via these mosquitoes.

Larvae of Anopheles subpictus Grassi, subspecies indefinitus Ludlow, which is indigenous to the Philippine Islands, and Aedes albopictus (Skuse) were found in the southern and central sections of Guam. This is the first record of established breeding of anopheline mosquitoes in the Micronesian area. The mode of introduction of the anopheline is unknown. No breeding areas have been found in the immediate vicinity of airfields to incriminate air transportation. The records indicate that these mosquitoes were first found in southern coastal areas in the immediate vicinity of beaches used as landing points during amphibious maneuvers. Up to the present time there is no indication that this anopheline is acting as a vector, in spite of the fact that there are a number of active carriers of malaria in the Guam population. A. albopictus has been reported from nearby Tinian and Saipan so it is not surprising that it has spread to Guam. A. aegypti was very common on Guam in 1944 and 1945, but it could not be found in the survey in 1948 and the first part of 1949. It is not known if previous intensive control measures against A. aegypti have resulted in complete eradication of this species, but that would be a possibility.

Culex quinquefasciatus Say was recently collected on Kwajelein Atoll where its presence was not reported previously. It is reported that it is now also established on another island of a very isolated group, which was previously a mosquito-free area.

The findings of this study indicate that mosquitoes which can serve as vectors of human diseases deserve continual surveillance. (From material in a paper read at the 1949 Pacific Science Congress held in New Zealand by W. C. Reeves, Research Associate, Neurotropic Virus Unit, George Williams Hooper Foundation for Medical Research, and Lecturer, School of Public Health, University of California)

Note: It is pointed out that the introduction of Anopheles mosquitoes into a formerly free area, in one instance at least, was more probably due to ship-borne than to air-borne transfer. This highlights the importance of close observance of BuMed Circular Letter No. 48-36, dated 24 March 1948 which requires careful disinsection and elimination of breeding sources on all surface vessels leaving ports where insect borne diseases are known to exist. (Preventive Medicine Div., BuMed)

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Recording of Causes of Death: One of the results of last year's international conference in Paris, France, for the revision of the International List of Causes of Death was the recommendation that a change be made in the method of selecting the principal cause of death for vital statistics when more than one cause is listed on the death certificate. Heretofore this selection has been made in accordance with a sort of priority system. Rules were set up covering all the combinations; these rules said, in effect, that if the death certificate listed conditions "A," "B," and "C," condition "A" took precedence over "B," and "B" over "C." In general, these rules functioned well; in most cases in which "A," "B," and "C" were present, "A" was, in fact, the main cause of death, and "B" and "C" were secondary. But like all general rules, they failed to take account of the exceptions - the occasions when "A" was only incidental, and "B" or "C" was actually the most important condition present.

To correct this deficiency, the physician signing the death certificate is now requested to indicate what, in his opinion, is the underlying cause of death. This underlying cause will be used as the basis in making most statistical tabulations.

The underlying cause of death is defined as the disease or injury which initiated the train of morbid events leading to death. It does not mean only the last condition the patient had which was the immediate cause of death, although sometimes, as in injuries for example, the immediate and underlying cause may be the same. The intent is to have recorded, in addition to the intervening and terminal events, the condition which gave rise to these events, and without which they would most likely not have occurred. This type of recording places a heavy responsibility on the physician to exercise great care in the preparation of the certificate.

To make it easier for the physician to record the essential information, the medical certification portion of the death certificate in use in the United States has been revised this year. NAVMED-N (Certificate of Death) has also been revised and is soon to be distributed together with a BuMed circular letter. The medical certification portion of NAVMED-N is now the same as that on civil certificates. The certification is divided into two parts; the first is for recording the conditions leading directly to death, from the immediate cause back to the underlying cause which is stated last; the second is for recording any incidental conditions which may have contributed to death but which were not related to the underlying cause. There is also space for showing the approximate time relationships among the various conditions.

An example of the way the form will be used follows: a patient known to have had arteriosclerotic heart disease for five years developed a coronary thrombosis and a myocardial infarct. Twenty-four hours later he died because of heart failure. At autopsy he was found to have the conditions mentioned above plus an early carcinoma of the stomach. The medical certification would be prepared as follows:

27. CAUSE OF DEATH	I. DISEASE OR CONDITION DIRECTLY LEADING TO DEATH. (This does not mean the mode of dying, e.g., heart failure, asthenia, etc. It means the disease, injury or complication which caused death.)	(a) Infarction of Myocardium (4701)*	APPROXIMATE INTERVAL BETWEEN ONSET AND DEATH 1 day
	ANTECEDENT CAUSES. (Morbid conditions, if any, giving rise to above cause (a) stating the underlying cause last.)	DUE TO (b) Thrombosis, Coronary Artery (4702)*	1 day
		DUE TO (c) Arteriosclerotic Heart Disease (4700)*	5 years
	II. OTHER SIGNIFICANT CONDITIONS. (Conditions contributing to death but not related to the disease or condition causing death.)	Adenocarcinoma, Stomach, Fundus (1400)*	Unknown (early)

*Diagnoses numbers refer to the new joint nomenclature soon to be adopted.

(Statistics of Navy Medicine, May '49)

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Availability of New Antibiotics: The below listed antibiotics are now available from continental medical supply depots as indicated:

1-607-410	Procaine Penicillin "G" for Aqueous Injection, 1,500,000 Units	Bottle	Brooklyn	Oakland
1-607-422	Procaine Penicillin "G" Crystalline in Oil with Aluminum Monostearate 300,000 units per cc., 10 cc.; replacement for 1-606-795.	Bottle	Brooklyn	Oakland
71-970-437	Dihydrostreptomycin, 1 Gm.	Bottle	Brooklyn	

Attention is invited to the fact that dihydrostreptomycin is intended only for use in the treatment of tuberculosis. (Materiel Div., BuMed)

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Training Program in Medical Aspects of Radiological Defense: The Armed Forces Special Weapons Project has received an invitation from the Atomic Energy Commission for Armed Forces participation in the Fellowship Training Program in Bio-Physics, Biology, and Medicine which has been developed by the Atomic Energy Commission. The training involved in this program will cover a period of approximately 12 months and will be composed of a basic phase and an advanced phase.

For the basic phase, which begins on 1 July 1949 and lasts for about 6 months, those assigned will be sent to Portland, Oregon, where they will receive instruction from members of the faculties of the University of Oregon, the University of Oregon School of Medicine, the Oregon State College, and Reed College. The basic training at Portland will include courses in biology, mathematics, physics, and chemistry as they apply to atomic energy. In addition there will be an opportunity to participate in research and development in this field, combined with activities in clinical medicine and biology.

Upon completion of the basic training phase, the students will be sent to The Institute of Nuclear Studies at Oak Ridge, Tennessee, for advanced study for a period of six months. During this phase, the students will attend conferences and participate in the laboratory program of the institute. In addition, to a general coverage of the field, specialization in a particular phase of atomic energy as related to medicine will be possible.

Requests are desired immediately from medical officers of the regular Navy who are interested in this field. Each request must contain a three-year service agreement. Reserve medical officers who have served at least one year of active duty may apply providing they (1) agree to submit application for transfer appointment in the regular Navy, (2) agree to accept their commission when tendered, and (3) sign the required three-year service agreement. Requests may be made by dispatch when required and must be confirmed by letter. (Professional Div., BuMed)

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Graduate Medical Training Program: BuMed Circular Letter 49-50, a copy of which is contained in this issue, see page 37, contains information and instructions concerning internships and residencies.

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Dental Internships Approved: The Council on Dental Education of the American Dental Association on 19 April approved the program of dental internship at the following Navy activities:

> Naval hospitals, Great Lakes, Ill.; Philadelphia, Pa.; St. Albans, N.Y.; San Diego, Calif., and the Naval Dental School, National Naval Medical Center, Bethesda, Md.

The dental service at these activities had previously been approved by the Committee on Hospital Dental Service of the American Dental Association during the period of from 4 August 1947 to 1 February 1949.

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BUMED CIRCULAR LETTER 49-43 15 April 1949

To: MedOfsCom, Naval Hospitals

Subj: Standard Admission Record, NAVMED-1285 (Rev. 2-49); Use of

Encl: 1. (HW) Admission Record, NAVMED-1285 (Rev. 2-49).
2. (HW) Sample Admission Records; adapted for several categories of patients.
3. (HW) Local Admission Slip.
4. (HW) Guide for Local Adaptation of Standard Admission Procedure.
5. (HW) Staff Locator Card, NAVMED-1286.

Suggestions from operating officials and data compiled during a study of hospital admission procedures have been incorporated in a standard Admission Record, enclosure 1, to be used in lieu of local admission cards for the initial and later recording of admission information. It is anticipated that the complete coverage of admission information afforded by this form will provide the means for eliminating several supplemental files now maintained in the Record Office and that it will be the basis for establishing uniform admission procedures. Further guides for the installation of this form and the general standardization of admission procedures are supplied in enclosure 4. The completion of a worksheet, similar to enclosure 3, may be desirable for various reasons prior to typing an admission record.

These standard admission forms are available and in accordance with instructions contained should be ordered from the appropriate District Publications and Printing Office.

A companion form, the standard Staff Locator Card, enclosure 5, an initial supply of which is being forwarded to each addressee, provides the basis for an alphabetical file at the Information Desk, Post Office and Staff Quarters for the quick location of military and civilian staff personnel.

The standard Admission Record and Staff Locator Card are to be put into use on or prior to 1 July 1949, and shall replace local forms used for the same purposes. Suggestions and comments for revision are invited after a suitable trial period.

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BUMED CIRCULAR LETTER 49-44 19 April 1949

To: All Ships and Stations

Subj: Neuropsychiatric Centers: Designation and Establishment of

1. Effective this date the U. S. Naval Hospital, Philadelphia, Pennsylvania, and the U. S. Naval Hospital, Mare Island, Vallejo, California, are designated and established as the Neuropsychiatric Centers for the East and West Coast respectively. Transfers to these Centers shall be in accordance with current instructions.

2. All directives contrary to this letter are cancelled or superseded.

3. Paragraph 16B25, Manual of the Medical Department, will be corrected accordingly in future manual changes. --BuMed. C. A. Swanson

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BUMED CIRCULAR LETTER 49-45 21 April 1949

To: All Activities Providing Out-Patient Treatment for Dependents of Armed Forces Personnel

Subj: Monthly Summary Medical Care of Dependents NavMed-669; Additional Data Required

Ref: (a) Par. 4111 MMD
(b) BuMed Cir. Ltr. No. 48-106

It is directed in this letter that the subject report for April and thereafter include certain additional data on out-patient visits and examinations of dependents of Army and dependents of Air Force personnel. Reference (b) is modified accordingly.

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BUMED CIRCULAR LETTER 49-46 25 April 1949

To: All Ships and Stations

Subj: Medical Department Money Allotments for Ships, Fiscal Year 1950

Refs: (a) BuMed CircLtr 48-50; AS&SL Jan-June 1948, 48-338, p. 161.
(b) BuSandA Manual, Vol. III, Paragraph 36001(4).
(c) BuMed CircLtr 45-178; AS&SL July-Dec 1945, 45-801, p. 342.
(d) BuMed CircLtr 48-26; AS&SL Jan-June 1948, 48-165, p. 155.
(e) BuMed CircLtr 48-143; N.D. Bul. of 15 Dec 1948, 48-938.

This letter, a copy of which appears in the 30 April issue of the Navy Department Bulletin, (1) sets forth the Medical Department allotments for

fiscal year 1950 for certain type ships in commission and not assigned to the reserve fleets, (2) contains information concerning the availability of the allotments for expenditure and obligation including that for dental supplies when indicated, (3) states that the Supply Department of the ship is to be furnished the classification and allotment numbers as required by BuSandA directives, (4) directs that the ships in (1) above prepare and submit an annual purchase requisition in accordance with reference (e), (5) states that the accountability by vessels with or without an allotment shall be maintained on board in the manner prescribed in current directives and shows the form for the quarterly financial report letter to BuMed, and (6) states that certain types of small vessels usually require only medical or dental stores listed in the Army-Navy Catalog of Medical Material and gives instructions concerning the acquisition of such supplies by these vessels.

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BUMED CIRCULAR LETTER 49-47 25 April 1949

To: All Ships and Stations

Subj: Designation of the Library at the U. S. Naval Medical School, National Naval Medical Center, Bethesda, Maryland, as the Edward Rhodes Stitt Library

Ref: (a) SecNav ltr of 19 Apr 1949.

1. Pursuant to reference (a) the Medical Library at the U. S. Naval Medical School, National Naval Medical Center, Bethesda, Maryland, was on 22 April 1949, designated as the Edward Rhodes Stitt Library in honor of the recently deceased Rear Admiral Edward R. Stitt, MC, USN, who was Surgeon General of the Navy from 1920-1928. --BuMed. C. A. Swanson

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BUMED CIRCULAR LETTER 49-48 26 April 1949

To: Holders of the Bulletin of Bureau of Medicine and Surgery Circular Letters

Subj: BuMed Circular Letters; Cancellation of Several

This letter states that because the BuMed circular letters listed below have served their purpose they are now canceled:

44-74	45-25	45-223	46-64	47-53
44-84	45-153	46-25	46-184	48-11

BUMED CIRCULAR LETTER 49-49 26 April 1949

To: Commanders, All Naval Training Centers
Commanding Generals, U. S. Marine Corps Recruit Depots

Subj: Venereal Disease in Recruits; Reporting of

Refs: (a) Par. 2182, MMD
(b) Par. 2184, (p) (q), MMD
(c) Par. 339.2, MMD
(d) Navy Recruiting Service ltr #56-48 dtd 19 Oct 1948.
(e) Comdt MarCor ltr MC-1051367 dtd 18 Oct 1948.

Encl: 1. (HW) FSA Form PHS-956(VD).

In this letter information and instructions are given concerning the reporting of venereal disease in recruits.

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BUMED CIRCULAR LETTER 49-50 26 April 1949

To: Medical Officers in Command, U. S. Naval Hospitals

Subj: Graduate Medical Training Program (Internships and Residencies)

Refs: (a) BuMed CL No. 47-163.
(b) BuMed CL No. 49-12.
(c) Par. 5129A MMD.
(d) Par. 5129C MMD.
(e) Essentials of an Approved Internship (Revised to December 1948; originally published JAMA 72:1757 (June 14), 1919).
(f) Essentials of Approved Residencies and Fellowships (Revised to December 1948; originally published JAMA 90:922, 24 Mar 1928).
(g) Outline of Graduate Medical Training Program in the U. S. Navy, 1 May 1946 and revised 15 Nov 1947.

1. Ref. (a) is hereby cancelled and superseded. Ref. (g) is also cancelled and will be superseded at a later date. Refs. (b), (c), and (d) remain in effect.

2. Ref. (e) is to serve as the standard and basis of approval for a twelve-months' rotating internship within naval hospitals. To insure the eligibility of naval interns for a medical state licensure upon completion of their intern period, a proposed schedule for intern training based on one year's service in an approved naval hospital is listed for compliance.

A. Medical Service		14 weeks
General Medicine	8 weeks	
Neurology and Psychiatry	3 weeks	
Pediatrics	3 weeks	
B. Surgical Service		16 weeks
General Surgery (Minimum of 6 appendectomies; 6 hernias; and serve as Asst. in 12 other major operations)	10 weeks	
Orthopedics	2 weeks	
Urology	2 weeks	
Ophthalmology and Otolaryngology	2 weeks	
C. Obstetrics (Observe 25 deliveries and deliver 12 under supervision)		8 weeks
D. Pathology (Commonwealth of Pa. ONLY, requires 8 wks.) (Observe 36 necropsies per year)		6 - 8 weeks
E. Radiology		2 weeks
F. Anesthesia (Administer 15 anesthetics of various types under supervision)		2 weeks
	TOTAL	48 - 50 weeks

Additional 2-4 weeks to complete one year of intern training may be used in conjunction with the above services or in subspecialties of tuberculosis, cardiology, diabetes, communicable diseases, allergy, etc.

The obstetrical and pathological services shall be separate assigned services and not taken in conjunction with other services.

Each naval intern is to attend clinical conferences and is required to present at least one medical paper during his internship.

Each intern should be encouraged at the beginning of his intern year to ascertain the specific requirements of the State in which he desires to obtain licensure. In the event that the requirements from a State are not met by the above rotational program of training, the medical officer in command should adjust the pattern of rotation to meet the needs for each intern.

3. Ref. (f), Essentials of Approved Residencies and Fellowships, as prepared by the Council on Medical Education and Hospitals of the American Medical Association, is to serve as the standard and basis of approval for residencies in the various specialties represented by an American Specialty Board. Medical officers who consider themselves eligible to apply for permission to take the examination for certification by an American Specialty Board are required to apply directly to the Bureau of Medicine and Surgery for an evaluation of their formal training

credits. Applicants for admission to membership in the American College of Surgeons or the American College of Physicians are to submit their applications to the Bureau of Medicine and Surgery for evaluation and endorsement by the Surgeon General who serves as the Governor of these Colleges for physicians in the naval service.

4. Copies of Refs. (e) and (f) are available in BuMed.

--BuMed. C. A. Swanson

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BUMED CIRCULAR LETTER 49-51 28 April 1949

To: All Ships and Stations

Subj: Albumin, Serum, Human; Plasma, Normal, Human, Dried and Other Blood Derivatives; Potency Data and Disposition Instructions

Refs: (a) BuMed CirLtr 48-91; N.D. Bul. of 31 Aug 1948, 48-643.
(b) AlNav 336-45; AS&SL July-December 1945, 45-1418, P. 165.
(c) AlNav 592-46; AS&SL July-December 1946, 46-2118, P. 92.

Encl: 1. (HW) Disposal Instructions for Expired Blood Derivatives.

This letter, which appears in full in the Navy Department Bulletin of 30 April, establishes potency periods, rules for storage, and disposition instructions concerning subject materials. References (a), (b), and (c) are canceled.

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BUMED-4112-CMp-mfd, P3-1/ET12 19 April 1949

To: The Secretary of the Navy
Via: The Chief of Naval Operations

Subj: Disestablishment of the U. S. Naval Medical Unit, U. S. Public Health Service Hospital, Fort Worth, Texas; Recommendation for

Ref: (a) Op24/avp Serial 33P24, 24 January 1947 (Navy Department Bulletin 47-56)

1. The subject named Unit, assigned to the management control of the Bureau of Medicine and Surgery by reference (a), has served its purpose. The categories of patients presently cared for by this Unit will be hospitalized in the future at the U. S. Naval Hospitals, Philadelphia, Pennsylvania and Mare Island, California.

2. It is therefore recommended that the U. S. Naval Medical Unit, U. S. Public Health Service Hospital, Fort Worth, Texas, be disestablished as of 30 June 1949. --BuMed. H. L. Pugh

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