keep certain vital records; and through this means decrease disease in the community and safeguard the public.

There have been from time to time many added detailed duties which various health departments have usurped and which often may have a public health factor in a very broad sense. Some of these are not real public health issues, but social problems and maladjustments.

To strictly draw a line of demarcation between the practice of medicine by a governmental agency, as represented in this instance by the public health departments, and private practice is almost impossible. The indigent, we all agree, are a problem that faces the community as a whole; but if Mr. X, who is not an indigent, has a mitral stenosis it is a problem that belongs strictly to Mr. X, and does not concern the community as a whole. The treatment of disease in those classes that are nonindigent rightfully belongs to and is the business of the patient and his doctor.

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H. M. Bracken, M.D. (Retired State Health Officer, Minnesota, 1897-1919, Claremont).—This is a timely paper. One important question is, should a health center care for the indigent sick? I think not. It is a dangerous procedure to combine under the same roof health problems and clinical problems. The diagnostic and therapeutic services for the indigent should be carried out under hospital supervision through the outdoor department or the hospital itself, rather than under the health department. A health center should give its attention to the prevention of disease, not to its treatment.

The health center does not need a social service department. The hospital does; and for a dual purpose. First, to see that only the indigent are cared for at public expense. Second, to see that those who need follow up treatment report for such as directed. This latter applies especially to the treatment of venereal diseases.

There may be districts in which there are no hospitals where the ambulant indigents can be cared for. Under such conditions it may be necessary to have an "outdoor department" for the sick at a health center. It is unusual, however, to find a health center in a district where a hospital is not easily accessible. If an outdoor department is to be operated as a health center it should be as a distinct unit under a group of trained medical men, including the specialists. The county medical society should be thoroughly interested in the make-up of this staff. The health activities at such a center should be carried on by a staff of thoroughly trained health agents.

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John H. Graves, M. D. (977 Valencia Street, San Francisco).—Doctor Howson's paper indicates a thorough knowledge of the subject and makes it possible for him to deal with the various phases of the problem with entire fairness.

There is a legitimate field of activity for the health officers of federal, state, and local health departments, and the splendid results of their work must be obvious to the most casual observer. It is unfortunate that in certain instances the bureaucratic spirit is evidenced by a tendency to transgress on territory and engage in activities which clearly belong to curative medicine. Speaking for the State Department of Public Health, the controlling board of which is composed of officers and members of this Association, it is almost unnecessary to say that the State Department of Public Health is distinctly against the invasion of the legitimate field of the practicing physician by the health officers under its control.

It is true that the line which divides the fields of public health activity and the physician's practice is, in places, ill-defined and scarcely perceptible. It is, and will be, the policy of the State Board of Health to make this dividing line as clear and distinct as possible.

It is the Board's purpose to secure friendly and harmonious coöperation of all the forces and agencies interested in the prevention and cure of disease so that a more efficient service will be rendered. The physicians must accept the responsibility for, and make a practice of, immunization of children under school age. Some of the heaviest onslaughts of diphtheria occur before the age of six or seven years, and the State Board is developing a program with the physicians of the State, through the county societies, by which the family physician will, at a proper time, send a card of notification to the parents that the child should be immunized. The Board believes that the great majority of parents will heed this advice and that the physicians are perfectly willing to perform the immunization on the same basis that they render other professional service to their patients. We hope to furnish duplicate cards which will be forwarded the health department and will give statistical evidence of the number of children who have been immunized. These figures, compared with the birth statistics, will give an excellent estimate of the number who have not been immunized.

Intelligent effort along similar lines will unquestionably greatly increase protection to childhood, lessen the work of the health officer, and add to the practice of the physician.

An intelligent appreciation of the problem on the part of all, a little more of harmonious coöperation, and a little less of caustic comment, will unquestionably go far toward solving the problem.

PERINEPHRITIS—SUPPURATIVE AND NONSUPPURATIVE*

By Charles Pierre Mathé, M. D.
San Francisco

Discussion *by George F. Schenck, M. D., Los Angeles; Robert V. Day, M. D., Los Angeles; Frank Hinman, M. D., San Francisco.*

INFECTION of the perinephritic tissues is of great interest to all studying kidney diseases because of extreme difficulty in diagnosis resulting from meager clinical signs, obscure symptoms, and lack of urinary disturbances. Perinephritis is a term applied to inflammation of the cellulo-adipose tissue surrounding the kidney and includes the renal capsule. In Germany the term "perinephritis" is limited to inflammatory processes of the kidney capsule, and the name "paranephritis" is applied to those involving the perirenal fat. These distinguishing terms, however, have not been generally adopted. The type of acute perinephritis which is secondary to inflammatory conditions of the kidney, such as nephritis, cortical abscess formation, tuberculosis, nephrolithiasis, etc., is often unrecognized on account of being overshadowed by the pathological findings presented by the kidney itself. Likewise, primary perinephritis is unrecognized because the adjacent healthy kidney causes no symptoms and fails to reveal any pathologic findings in making a urological examination. Primary and secondary suppurative conditions of the perirenal tissues, commonly known as perinephritic abscess, also present a difficult problem of differential diagnosis; yet treatment of these conditions, in order to be efficacious, must be instituted early. In making routine autopsies, I have been impressed by the frequency of perinephritis which had, in many instances, entirely escaped the attention of the attending physician. In the course of making surgical inter-

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* Read before the Urology Section of the California Medical Association at the sixty-first annual session, Pasadena, May 2–5, 1932.

ventions on the kidney, I have observed inflammation of the perirenal tissues in all stages of development, viz., suppuration, resolution, and cicatrization. In some instances these inflammatory processes were entirely unsuspected; in others, they had been recognized by their signs and symptoms. These observations prompted me to make a study of perirenal infection, correlating their signs and symptoms for the purpose of classifying, clarifying, and facilitating their recognition in the future.

HISTORICAL NOTE

As early as 460 B. C., Hippocrates, in chronicling his daring operations on the kidney, described perinephritic abscess and advised "as soon as a swelling has appeared in the region of the kidney, one should incise it down to the kidney." Yet thorough understanding of suppurative and nonsuppurative perinephritis is of quite recent date. Isolated observations were made by Chopart and Civiale in the early part of the nineteenth century; but it remained for Rayer, who in 1839 made a thorough study, to give us a rational classification of these infections, dividing them into primary and secondary groups. A little later Trousseau made a most excellent contribution on perinephritic abscess; since then others have added very little to his classical description of the pathogenesis of this condition. Later Nieden, Rochet, Gibney, Hartmann, Kuster, Albarrán, Jordan, Legueu, Guiteras, Braasch, Hunt, Peacock, Brunn, and Rhodes added important observations. The principal pioneers in blazing the way of surgical relief of painful perinephritis were Le Dentu, Israel, Rovsing, Edebohls, and Pousson. The works of Edebohls and Pousson on the surgery of nephritis were epoch-making. Later contributions by Von Lichtenberg, Kolischer, and O'Connor on nephrolysis have done much to emphasize the importance of surgical intervention in indicated cases.

ETIOLOGY

The classification of suppurative and nonsuppurative perinephritis is made in the following table. Limitation of space will not permit me to discuss its etiology and portal of entry in greater detail in this article. The etiology of perinephritis, characterized by fibrosis, which has been recognized very recently, is obscure; yet, in spite of this obscurity, the etiology of perinephritis is of great importance because of the great suffering associated with it, which has been often attributed to other lesions of the kidney and referred to as nephralgia. Most of the older writers, *i. e.,* Israel, Guiteras, Lott, etc., were of the opinion that perirenal inflammation was usually secondary to kidney lesions, being transmitted by the blood or lymph stream or by direct invasion. But the more recent work of Doberauer, Rehn, and others has shown that infection of the renal cortex and perirenal fat might occur independently. Infection of the perirenal fat alone occurs when selective organisms lodge in the end arteries of the network made up by the capsular branches of the renal, suprarenal, spermatic or ovarian, lumbar, colic, and superior and inferior mesenteric arteries.

CLASSIFICATION OF SUPPURATIVE AND NONSUPPURATIVE PERINEPHRITIS

I. Nonsuppurative perinephritis.
   1. Fibrosis of kidney capsule.
   2. Sclerosis of perirenal fat.
   3. Hypertrophy of perirenal fat (lipoma).
   4. Fibrolipomatosis of cellulo-adipose perirenal tissues.

   A. *Primary.*
      a. Hematogenous: Secondary to foci elsewhere in the body.
      b. Toxic: Secondary to generalized infections such as smallpox, scarlet fever, influenza, puerperal fever, etc.
      c. Traumatic: Resulting from contusion of perirenal tissues or infection of hematoma.

   B. *Secondary.*
      a. Resulting from lesions of the kidney, such as nephritis, pyelonephritis, tuberculosis, nephrolithiasis, etc.
      b. Resulting from inflammatory conditions of the skeletal and muscular structures making up the renal fossa such as myocytis, spondylitis, osteomyelitis, etc.

II. Suppurative perinephritis.

   A. *Primary.* (Independent of kidney lesions or those of neighboring thoracic and abdominal organs.)
      a. Hematogenous: Secondary to foci elsewhere in the body—skin lesions such as boils, furuncles, carbuncles, impetigo, eczema, etc.; osteomyelitis, paronychia, etc.
      b. Toxic or hematogenous: Secondary to generalized infections such as smallpox, scarlet fever, typhoid fever, influenza, puerperal fever, anthrax, gonorrhea, etc.
      c. Traumatic: Caused by lowered resistance of perirenal tissues resulting from contusion, infection of small and large hematoma, wounds, etc.

   B. *Secondary to the following extraneous lesions:*
      a. Kidney diseases: abscess formation, carbuncle, pyelonephritis, pyonephrosis, tuberculosis, lithiasis, etc.
      b. Suprarenal diseases such as Addison's disease, infections of adrenal gland, etc.
      c. Intestinal lesions: appendicitis, infections of the duodenum, intestines, and colon.
      d. Affections of the abdominal and pelvic organs: spleen, pancreas, prostate, uterus. etc.
      e. Infections of the skeletal and muscular structures making up the renal fossa: tuberculosis of the spine, myocytis of psoas muscle, etc.
      f. Thoracic lesions: suppurative pleurisy, lung abscess, suppurative mediastinitis, etc.
      g. Postoperative: Abscess formation after nephrectomy: secondary to silk sutures, to leaving portions of infected kidney behind, to tuberculous involvement of the perirenal tissues and to insufficient drainage after kidney operations.
      h. Unusual conditions: Secondary to foreign bodies such as bullets, etc.

SIGNS AND SYMPTOMS

I. *Nonsuppurative Perinephritis.*—The onset of perinephritis is insidious; it is characterized by pain, hematuria, and occasional tumefaction of the kidney. This pain is usually experienced in the upper abdomen or loin and is of the constant, dull

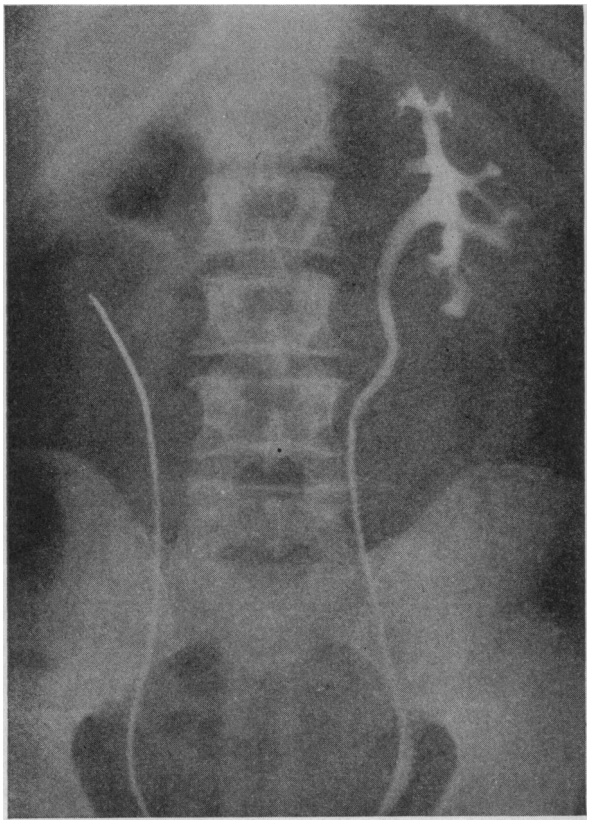

Fig. 1.—Ureteropyelogram in vertical position of male, age 34, presenting persistent fever, pain and tenderness in left kidney region and slight leukocytosis. Note obscuration of the psoas shadow and immobility of the kidney. Perinephritic abscess suspected, but at operation cicatrizing perinephritis was encountered which had encased the kidney in an inelastic shell impairing its function and anchoring it to the surrounding structures.

variety, nonradiating in character. It might also simulate the form of renal colic which is usually associated with calculous disease, strangulation of the kidney, and ureteral stricture. It is persistent and does not yield to medical treatment, gradually wearing down and weakening the patient. Perinephritis is often accompanied by varying degrees of interstitial nephritis which might be well advanced or relatively of very small degree. This associated nephritis may not give rise to any signs, yet the accompanying perinephritis may be very extensive although no albumin nor casts are found in the urine. Hematuria occurs in a certain percentage of cases; in others red blood cells are found only by making a microscopic examination of the urine. It is sometimes caused by an associated nephritis, but in most cases the blood is due to strangulation and congestion of the kidney, resulting from compression by the cicatrizing perinephritis, which tightly encloses the kidney in a nonelastic shell. In nonsuppurative perinephritis there is usually no fever and no leukocytosis. In some cases there is slight elevation of temperature, causing one to confuse it with perinephritic abscess. Such was the case of Mr. W. M., who entered Southern Pacific Hospital on September 10, 1931, because of constant, dull, aching, nonradiating pain in the left loin, chills and fever, malaise, and anorexia. Urological examination revealed tenderness in the costovertebral angle, obliteration of the psoas shadow, and a normal kidney which was found to be firmly fixed to the surrounding structures. We thought that we were dealing with a perinephritic abscess and decided on surgical intervention. In exploring the renal fossa we failed to encounter suppuration; and the perirenal fat was found to be involved by an inflammatory process undergoing resolution. Careful inspection of the kidney failed to reveal any cortical abscesses, but pathological examination of the excised perirenal fat revealed subacute, nontuberculous, cicatrizing perinephritis. The patient made an uneventful recovery; the wound healed and he has been relieved from the pain of which he complained.

In some cases there is enlargement of the kidney, particularly in that type of perinephritis characterized by fibrolipomatosis in which the fatty capsule has become hypertrophied, hardened, and thickened, involving the entire renal fossa and sometimes invading the renal parenchyma itself. (See Fig. 1.) Palpation of the kidney with employment of a fine sense of touch, so well developed by the older masters, will aid in distinguishing the fibrolipomatous type of perinephritis from enlargement of the kidney due to other causes.

Immobility of the kidney is a characteristic sign of perinephritis and cortical abscess of the kidney. Lack of motion of the kidney during respiration was first described by Albarrán in the latter part of the last century, who pointed out that one could often diagnose perinephritis with adhesions from other lesions. The following are his exact words: "Du fait que le rein augmenté de volume à la palpation, ne présentait pas de mobilité spontanée, pendant que le malade exécutait de grandes inspirations."

Lack of normal mobility or descent of the kidney as determined by making a pyelogram in the vertical position was first described by the author in 1925. It is a very important differentiating sign in the diagnosis of suppurative and nonsuppurative perinephritis as well as inflammatory lesions of the renal cortex. Its reliability has been verified repeatedly by operation for the past seven years. Another diagnostic point is displacement of the ureter which is caused by hypertrophy of the perirenal fat or by adhesions of the cicatricial tissue of the perinephritic space to the blood vessels making up the renal pedicle.

II. *Suppurative Perinephritis.*—Like perinephritis, the onset of perinephritic abscess is rarely sudden. The abscess develops rather slowly, does not manifest itself for some time, and is usually discovered only after it has produced general symptoms characterized by persistent fever, chills, obscure abdominal symptoms, and additional signs of encapsulated infection. Of all the signs and symptoms, fever is the most constant and reliable guide in diagnosis; it, the fever, is usually ushered in with a chill, is remittent in type, and because of this persistent elevation of temperature perinephritic suppurative processes are often confused with typhoid fever, ulcerative colitis, influenza,

Fig. 2a.—Ureteropyelogram in horizontal position of female, age 30, presenting persistent pain and tenderness in left kidney region over a period of ten years. The position of the kidney is indicated by markings on the lumbar vertebrae, the upper pole being located opposite the transverse process of the twelfth thoracic and the lower pole opposite the lower portion of the body of the third lumbar vertebrae.

Fig. 2b. — Ureteropyelogram in vertical position of same case. The right kidney makes quite an excursion caudad, whereas the left kidney remains anchored in place. Pyelonephritis diagnosed because of persistent renal pain and immobility of the kidney. Operation on April 27, 1932, confirmed extensive cicatrizing perinephritis.

pleurisy, malaria, and other infections. Pain is quite variable, usually of the constant, dull, nonradiating variety, located in the flank or upper abdomen. In patients presenting second and third degree ptosis of the kidney, the pain may be very low in the abdomen, causing one to mistake perinephritic abscess for cholecystitis, appendicitis, salpingitis, pancreatitis, splenitis, hepatitis, and other abdominal conditions. In some cases the pain experienced in the renal fossa is rather sharp and may radiate to the abdomen, umbilicus, scrotum, or shoulder. Gastro-intestinal symptoms—nausea, vomiting, and constipation—are quite common. I recall a school teacher, age twenty-three, presenting pain in the upper abdomen, fever, and leukocytosis over a period of six weeks, who had lost forty-three pounds because of persistent nausea and vomiting. The severity of the gastro-intestinal symptoms distracted the attending physician's attention from a perinephritic abscess secondary to renal carbuncle which was later successfully treated by surgical drainage.

Tumefaction of the renal fossa is an important diagnostic sign. The swelling is usually associated with the kidney, does not move with respiration or with change of posture. Tenderness of the costovertebral angle, spasm and rigidity of the overlying musculature, congestion and reddening of the superficial skin, occur only after the abscess has attained large proportions, at which time it presents little difficulty in diagnosis. Needling the retrorenal space for the purpose of withdrawing pus for diagnosis is not without danger, particularly if the abscess happens to be located in front of the kidney. I recall a case of perinephritic abscess secondary to a boil in the gluteal region in which repeated punctures of the renal fossa elicited blood, but never pus. At operation an abscess was found anterior to the lower pole of the kidney, and in order to have entered it with a needle it would have been necessary to have traversed the entire kidney.

Examination of urine collected directly from the kidney in suspected cases offers little aid. In fact, in perinephritis, etc., there is a paucity of urine findings as compared to the severity of the illness. It usually shows slight trace of albumin, a few leukocytes and organisms and an occasional cast such as one finds in general infections such as pneumonia, typhoid fever, influenza, etc. In 1911 Baum showed that a certain percentage of cases of perinephritic abscess presented staphylococci in the urine if one would take the pain to centrifuge the urine over a long period of time and subject it to culture. Both Braasch and the author have been able to discover staphylococci in only a rather small percentage of such cases, and this sign, although of great assistance when present, occurs too infrequently to be of material value.

DIFFERENTIAL DIAGNOSIS

Many differential points in the diagnosis of suppurative and nonsuppurative perinephritis have been considered in the discussion of their signs and symptoms. The presence of persistent fever,

pain and tenderness in the kidney region, with lack or at least paucity of positive signs of infection in the kidney itself, should cause one to suspect perinephritis with or without suppuration.

The employment of the x-ray is of great aid. In cases of perinephritic abscess, fibrolipomatosis or extensive cicatrizing perinephritis, there is often obscuration of the margin of the psoas muscle, lower ribs, transverse processes of the lumbar vertebrae, and the kidney itself. The margins of the opaque shadows cast by these bony and muscular structures are rather indefinite and are not as sharply defined as in normal cases. This point was emphasized by Alexander and Revesz. Another diagnostic point is curvature of the spine with convexity away from the abscess. And this has been emphasized by Alexander, Lipsett, and Beer. Peacock recently pointed out the great diagnostic value of displacement of the kidney and ureter anteriorly and laterally due to tumefaction of the renal fossa, so well demonstrated by employing stereoscopic films. As has been mentioned before by the author in this and other papers, lack of renal mobility, ascertained by taking a pyelogram in the vertical posture, is of great importance in determining suppurative and nonsuppurative perinephritis as well as abscess formation of the cortex of the kidney. Still, with regard to x-ray, obscuration of the structures making up the renal fossa has been the subject of considerable speculation. In some cases it is due to the collection of pus in the renal fossa, the thickening of the fatty capsule due to fibrosis, hypertrophy of the perirenal fat, or to the edema usually associated with these inflammatory lesions. Occasionally a case of periarthritis, originating from spinal or hip disease, has been mistaken by the urologist for suppurative or nonsuppurative perinephritis. I wish to emphasize that these diagnostic roentgenological points are of value *only* when they are considered together with a careful study of the history, clinical course and findings in each individual case.

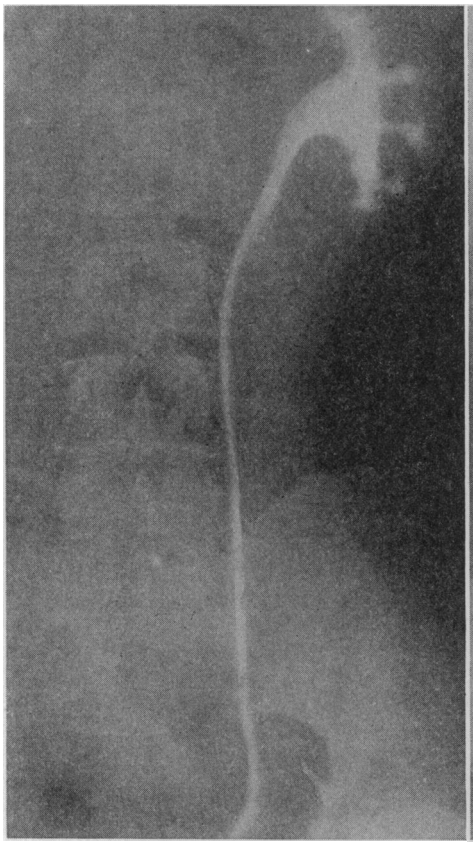

Fig. 3a.—Ureteropyelogram in horizontal position of a clergyman, age 45, presenting persistent pain in solitary kidney ten years after nephrectomy of its fellow for pyonephrosis.

Fig. 3b.—Ureteropyelogram made in the vertical position, demonstrating the author's sign: lack of renal mobility which is always demonstrated by making a pyelogram in the vertical posture and is due to suppurative and nonsuppurative perinephritis or cortical abscess formation of the kidney.

TREATMENT

A certain number of cases of inflammatory processes of the perirenal tissues undergo resolution spontaneously, causing no further symptoms to the patient nor damage to the kidney. Other inflammatory conditions result in frank suppuration which may be limited to the renal fossa or may rupture into the lung, peritoneal cavity, or into the skin of the loin. Others result in sclerotic thickening of the perirenal capsule which may surround the kidney and ureter, impairing the functional activity and efficiency of the kidney and obstructing the outflow of urine. This results in hypostenuria, a term coined in order to depict the inability of the kidney to adjust itself to increased demands on its functional activity by reason of its being encased in a hard, inelastic, fibrous shell formed by fibrosis of the perinephritic tissues, which impairs the velocity of the blood stream in the kidney and hampers its efficiency. In others there is a hypertrophy of the perirenal fat, so-called fibrolipomatosis, which may involve the renal fossa and invade the hilus of the kidney and renal parenchyma itself. (See Fig. 4.)

Undoubtedly a certain number of cases of nonsuppurative perinephritis undergo resolution, causing little or no damage to the kidney nor further disturbance to the patient and require no further treatment. But for the cases in which fibrosis of the renal capsule and cicatrization of the perirenal fat cause persistent pain and impairment of renal function, surgical intervention is the only chance for relief.

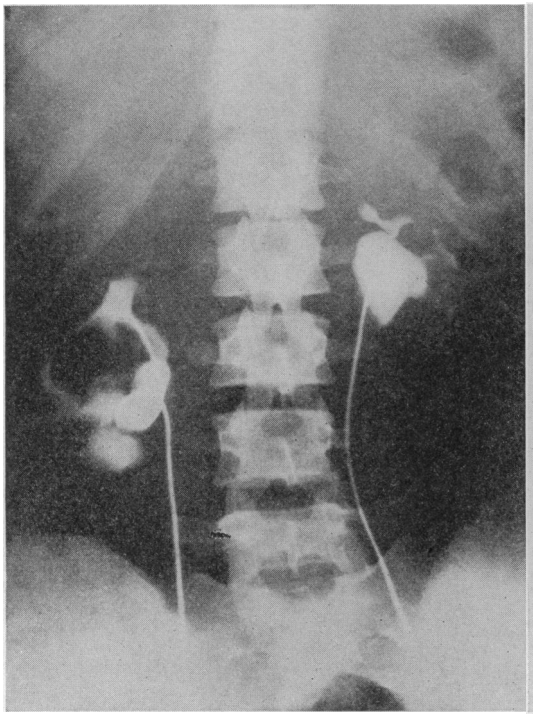

Fig. 4a.—Bilateral ureteropyelogram of female, age 29, presenting right-sided lumbar pain and tenderness of costovertebral angle. Note bizarre pyelogram presenting a pressure defect of renal pelvis.

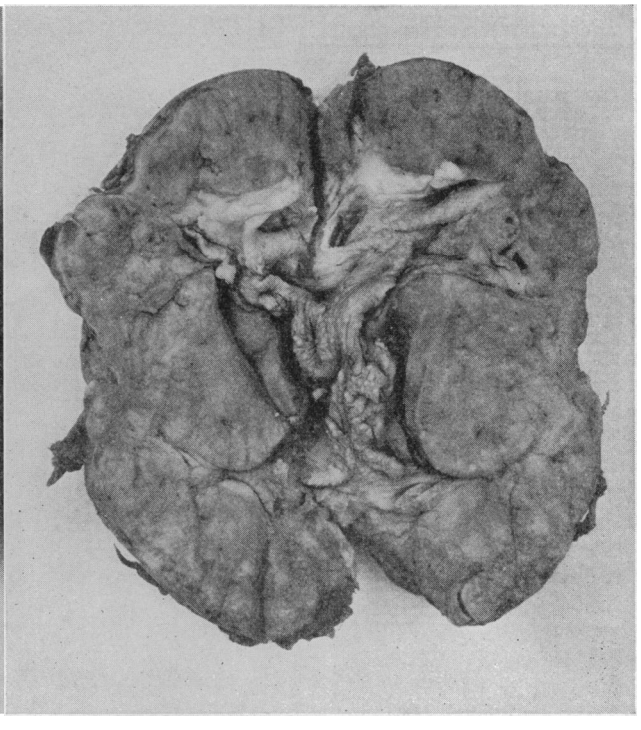

Fig. 4b.—Specimen removed by operation demonstrating invasion of the parenchyma of the kidney by fibrolipomatous infiltration of the perirenal fat, due to advanced perinephritis.

Nephrolysis, which consists of freeing the kidney of its cicatricial investment, and of destroying its pathological conglutinations, adhesions and attachments to surrounding structures, was first performed by Rovsing and then later advocated by Kolischer and O'Connor. Unfortunately this beneficent operation has not been popularized and is rarely employed, if it is not entirely overlooked by the profession. In properly selected cases it frees the patient from great suffering and restores the kidney to normal function. Such a case is that of Rev. T. O., who entered St. Mary's Hospital on April 9, 1931, because of persistent, dull pain, and the sensation of fullness in the left lumbar region. The right kidney had been removed nine years before because of pyonephrosis. Pain in the opposite kidney occurred some five years later and was attributed to pyelonephritis and stricture of the lower ureter as well as to compensatory hypertrophy of the kidney. In spite of the fact that the infection in the remaining kidney had been cleared up by routine lavage and the ureter dilated to fifteen (Charrière), the symptoms continued. As one could hardly attribute the persistence of pain in the remaining kidney to compensatory hypertrophy some ten years after nephrectomy of its fellow, a complete investigation of the kidney was repeated. In making a pyelogram of the solitary kidney, it was found to be immobile in the vertical position, being anchored to the surrounding structures by dense adhesions. (See Fig. 3.) There was obscuration of the shadow of the psoas muscle, vertebrae, and lower ribs. Surgical intervention was decided upon and, on approaching the kidney, it was found to be surrounded by a shell of thickened, indurated, sclerotic tissue which involved the perirenal fat and capsule of the kidney. The major portion of the thickened perirenal fat was removed and the kidney partially decapsulated. The patient made an uneventful recovery and was relieved from his debilitating pain, which in his case was unquestionably due to cicatrizing perinephritis.

In cases in which fibrosis is limited to the true capsule, decapsulation alone will often suffice to relieve pain and benefit any associated nephritis. In stripping the renal capsule it is well not entirely to separate it from the kidney. After freeing it from the kidney, one should replace it on its convex surface, facilitating future exposure of this organ should surgical intervention be required at a later date. In cases in which pain is marked, it is well also to perform denervation or renal sympathectomy. This consists of severing the nerves of the kidney which are found to be located on the superior surface of the renal artery and its main branches.

The treatment of suppurative perinephritis, commonly known as perinephritic abscess, consists of surgical drainage. Although a small percentage of these cases might undergo resolution, the greater percentage require open drainage. In opening the renal fossa one must explore the entire renal loge, as the abscess may be located anterior and inferior to the kidney. It is well to explore the kidney, particularly that portion which is found to be in close proximity to the abscess, in order to detect single or multiple cortical abscesses or carbuncle of the kidney which, if left untreated, might defeat the purpose of the oper-

ation. The removal of pus by needling, or aspiration, was performed by Gaddy and by Hartmann in the latter part of the nineteenth century. This procedure, although of some value in limited cases, has given way to the more accurate method of wide incision which is more efficacious in the majority of cases.

In primary suppurative and nonsuppurative perinephritis it is indeed important to clear up foci elsewhere in the body, such as skin lesions. In secondary perinephritis, treatment should be instituted to eradicate lesions of the kidneys, thoracic, and abdominal organs and the numerous extraneous lesions—completely tabulated in the table accompanying this article.

CONCLUSIONS

1. Suppurative and nonsuppurative perinephritis occur independently in a certain number of cases, as well as being secondary to diseases of the kidney and other extraneous lesions.

2. Chronic perinephritis is divided into (1) fibrosis of the kidney capsule; (2) chronic cicatrizing perinephritis with sclerosis of the perirenal fat; (3) fibrolipomatous perinephritis in which the fatty capsule is sclerosed, indurated and hypertrophied, sometimes forming a veritable lipoma which may invade the kidney parenchyma; and (4) suppurative perinephritis or perinephritic abscess in which the inflammatory processes have undergone suppuration.

3. The diagnosis of chronic perinephritis is obscure. Important points in distinguishing it are persistent pain, absence of urinary findings, and (the author's sign) lack of renal mobility, as evidenced by taking a pyelogram in the standing position. This lack of renal mobility demonstrates without any doubt that there are inflammatory processes of the perinephritic tissues which anchor the kidney in place.

4. The most important points in the diagnosis of perinephritic abscess are persistent fever, relative paucity of urine findings, and obscuration of the roentgenological shadow of the kidney, muscular and skeletal structures of the renal fossa, displacement of the ureter and immobility of the kidney as evidenced by palpation, and making a pyelogram in the vertical position.

5. The treatment of persistent, chronic, cicatrizing and fibrolipomatous perinephritis consists of nephrolysis and partial decapsulation by which the kidney is decompressed and liberated from its pathological encasement, adhesions, and conglutinations.

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DISCUSSION

George F. Schenck, M. D. (Westlake Professional Building, Los Angeles).—The most significant and most interesting part of Doctor Mathé's paper is that which deals with nonsuppurative perinephritis. The condition occurs to a variable degree with all of the diseases of the kidney that are of bacterial origin. In those conditions where primary perinephritis occurs it is often difficult to make a diagnosis. Doctor Mathé has previously contributed an original point that is a material aid in making the diagnosis; and that is, fixation of the kidney to the contiguous tissues producing immobility, which is manifested by taking kidney pictures with the patient standing.

Heretofore, we have not placed sufficient clinical significance on nonsuppurative perinephritis as a cause of discomfort to the patient, and as a source of constant damage to the kidney.

Suppurative perinephritis, commonly known as perinephritic abscess, frequently produces problems in diagnosis. The condition may simulate almost any disease in the chest, gastro-intestinal tract, or regional muscular and skeletal systems. The condition is masked more than half the time by the primary renal pathology. None of the symptoms or roentgen ray findings are by any means constant. The obliteration of the outline of the psoas muscle, curvature of the spine away from the abscess, and displacement of the kidney and ureter anteriorly and laterally are very suggestive when present. The urinary symptoms and findings are variable and are of little aid in making the diagnosis. The leukocyte count, as a general rule, is high, 10,000 to 30,000. A dull loin ache is perhaps the commonest and most significant symptom of nonsuppurative and suppurative perinephritis. Pain is often deceiving, but if localized in the loin and costovertebral angle, it is significant. Usually the pain is aggravated by motion and the patient walks with a rigid back. The temperature varies from zero to 104-105. It may be fulminating, or of the typical picket-fence type. If the infection is severe, chills usually precede the febrile onset, and may be followed by drenching sweats. Incidentally, the persistence of sweats is almost pathognomonic of suppuration.

Doctor Mathé has adequately emphasized the importance of complete kidney studies that include standing pyeloureterograms in these cases of primary and secondary perinephritis. The treatment is primarily surgical.

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Robert V. Day, M. D. (Wilshire Medical Building, Los Angeles).—It has been a privilege to hear Doctor Mathé's classical presentation of this important subject, from a standpoint of both diagnosis and treatment. He is to be congratulated on working out the Mathé sign—original with him. A certain other sign in suppurative perinephritis, emphasized by Peacock a few years ago, is a greater or less tendency to fixity of the thigh as a result of the reflex contracture of the psoas muscle in perinephritic abscess. As a result of personal observation I am inclined to believe that staphylococci, without pus, will be found in the urine of more than half the patients, if a special technique is used in the fixation of the smear of the tiny urinary sediment.

I wish to emphasize the warning against needling. If pus is present, incision will be required. Failure to obtain pus by aspiration is no indication of its absence; withal needling may well result in a serious accident.

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Frank Hinman, M. D. (384 Post Street, San Francisco).—Doctor Mathé has given a very interesting and complete discussion of the perirenal infections. It is generally regarded that of the two sources, renal and extrarenal, renal is by far the commonest and some even regard it as the only source of perirenal abscess worth clinical consideration. Diagnosis is often extremely difficult. Many of these patients get well. Stereopticon pictures, with catheter in ureter, are often quite helpful as the catheter can be seen to go up around what would be taken to be an abscess. Tumors of the perirenal area are extremely uncommon, although there have been about eighty lipomata reported. The differentiation of these tumors from renal tumors is more a problem than from perirenal abscess.