



UNITED STATES NAVY Medical News Letter

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Surgeons General of the Past

(The seventh in a series of brief biographies)



James Croxall Palmer was born 29 June 1811, received his medical diploma from the University of Maryland in 1834, and was appointed Assistant Surgeon in the Navy 26 March of that year, standing first among those appointed. He served in the Frigate Brandywine and then in the Sloop Vincennes during its cruise around the world 1836-1837. He accompanied the Wilkes Exploring Expedition to the Antarctic, 1838-1842, an expedition which was the first to view 1,500 miles of Antarctic Coast, and wrote a book, *Antarctic Mariner's Song*, about the newly discovered continent. He was a surgeon in the Sloop Vandalia, and later in the Steam Frigate Niagara which laid the first Atlantic cable 1855-1857. For the first 3 years of the Civil War he was in charge of medical service at the U.S. Naval Academy, then at Newport, R.I. In 1864, Doctor Palmer was Fleet Surgeon of the West Gulf Blockading Squadron and served with Admiral Farragut in the battle of Mobile Bay. He carried orders to the scattered monitors to attack the Tennessee and after the battle was instrumental in saving the life of Admiral Franklin Buchanan who had suffered a shattered leg in that ship. His efforts at the time resulted in an agreement that naval surgeons should not be treated as prisoners of war. Promoted to Medical Director in 1871, he was appointed Surgeon General of the Navy on 10 June 1872 and held that office until his statutory retirement on 29 June 1873. Commodore Palmer died in Washington, D.C., 24 April 1883, from malaria and other diseases contracted during the Civil War. Few of the other Surgeons General had so many striking experiences of historical interest. His contemporaries considered him to be "a scholarly man, of notable gifts as a writer, skilled in his profession, and faithful to every obligation during nearly 40 years in the naval service."

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The issuance of this publication approved by the Secretary of the Navy on 4 May 1964.

CONFERENCE ON THE ETIOLOGY OF CANCER OF THE GASTRO-INTESTINAL TRACT

Report of the Research Committee, World Health Organization on Gastroenterology,
New York, N.Y., June 10-11, 1965. Cancer 19(11): 1561-1566, November 1966.*

In June 1965 the Research Committee of the World Health Organization on Gastroenterology, headed by Dr. C. Barborka, sponsored a conference on the etiology of gastro-intestinal-tract cancer under the chairmanship of Dr. E. L. Wynder at the Sloan-Kettering Institute. The purpose of the conference, with the active support of Dr. T. Hunt, president of the organization, was to gather experts concerned with the epidemiology of gastro-intestinal-tract cancer and to exchange knowledge as to its etiology. On the basis of this exchange the conference was directed to consider factors regarded as epidemiologically established or suspected and to indicate future areas of research, both epidemiological and experimental, which are deemed most fruitful.

This report is not meant to be an essay on the etiology of gastro-intestinal-tract cancer but rather an outline of the most pertinent epidemiological factors considered by the group.

Gastric Cancer

Established Epidemiological Factors

1. Mortality from gastric cancer is decreasing in the United States. Incidence statistics from upstate New York and Connecticut show a similar decrease. In the last few years, however, incidence rates of gastric cancer in Connecticut appear to have leveled.

2. Gastric cancer is found more frequently in males than in females. For example, upstate New York's rate in 1963 was 15 per 100,000 for males and 8 per 100,000 for females. In Connecticut the 1962 rates were 19.8 for males and 9.6 for females. The same tendency is found in international statistics.

3. Regional studies of incidence in the United States show lower mortality rates from gastric cancer in the South for both males and females, and

the highest rates in the middle-atlantic states for both sexes.

4. International comparisons of mortality suggest that Japan, Austria and Finland have high rates of gastric cancer and that the English-speaking countries, particularly Australia, New Zealand, Canada and the United States (Caucasians only), have the lowest rates. The rates appear to be high generally in most South American countries. Data from Chile and Costa Rica are particularly pertinent in this respect.

5. The Japanese have higher rates than any of the other ethnic groups represented in the Hawaiian Islands.

6. As with cancer at most sites, urban areas have slightly higher incidence rates than rural areas.

7. Studies by Clemmensen in Denmark, the British Registrar General and Cohart and Graham in the United States show an increase in gastric cancer with a decrease in socio-economic status.

8. Studies of familial aggregation of gastric cancer suggest that there is approximately twice as much gastric cancer in kin of patients with the disease as among kin of control patients. Whether this finding is related to a common genetic or environmental trait or to both is not determined.

9. The rates of gastric cancer in pernicious anemia patients have exceeded expectations many times, as have rates for achlorhydria; from 4 to 5 times the expected number of gastric cancers are found in achlorhydric patients.

10. Studies from many sources of the ABO blood group distribution in gastric cancer show a relative incidence of 1.19:1 in group A patients compared with those of groups O or B by contrast with control subjects.

Suspected Epidemiological Factors

1. Studies by Haenszel and Graham of ethnic

* Those present at the committee meeting are listed in the Appendix following the article.

background of patients in the United States indicate that the foreign-born have significantly higher risks than the native-born.

2. Smith reported a higher risk of gastric cancer in the Japanese of Japan than among the Japanese of Hawaii and the West Coast.

3. Segi found that gastric cancer patients use less salty food, eat irregularly and consume more alcoholic beverages than controls. Wynder's replication regarding diet revealed that irregular eating was more characteristic of gastric cancer patients than controls; the other relationships were not discovered, however. Wynder's examination of ingestion of smoked foods showed no relationship.

4. A study by Graham suggests that frequent use of potatoes and the use of animal as opposed to vegetable fats is related to a higher risk of gastric cancer. Higginson found similar data for animal fats.

5. Acheson and Doll studied the use of a large number of foods including smoked fish and, using an interview schedule similar to that of Graham, found no excess risk for use of any specific food or item of drink.

6. The difficulties of obtaining reliable dietary data on what an individual has eaten prior to a given disease are recognized.

7. Edentia has characterized gastric cancer patients more frequently than in controls. (Sic)

8. Miscellaneous relationships to gastric cancer include possible high risks in workers exposed to iron dust and in individuals using various types of purgatives. American studies showed no association between gastric ulcers and gastric cancer while such a correlation is suggested by Japanese studies. There appears to be a correlation of hypertrophic and atrophic gastritis to the development of gastric cancer. There appears to be no association between tobacco smoking and gastric cancer.

Recommended Future Studies

1. Periodically, well-established relationships—those involving socio-economic status, regional differences, declining incidence, achlorhydria, pernicious anemia, blood type, national background and familial aggregation—should be replicated to establish whether the relationships continue to exist.

2. Close collaboration is desirable between the epidemiologist and the laboratory investigator. Blood studies, including serum-vitamin A and cholesterol levels, appear indicated. Secretors of mucopolysaccharides have a higher incidence of gastric cancer.

Replications and extensions of this research should be carried out. Attempts should be made to produce gastric cancer in select laboratory animals, such as mastomys and hamsters, by simulating human dietary patterns.

3. The pathologist should investigate further the association between gastric cancer and hypertrophic and atrophic gastritis.

4. Epidemiological studies should relate factors specifically to the site in the stomach at which gastric cancer occurs.

5. A worthwhile working hypothesis suggests that a dietary pattern high in carbohydrates and concomitantly low in proteins, fresh fruit and vegetables predisposes to gastric cancer. Such a dietary pattern is consistent with the socio-economic factor, the high rate of gastric cancer in Japan, Eastern Europe and South America and the declining rate in the United States. Future studies should concern themselves with dietary patterns in ethnic groups and countries among which exist different rates of gastric cancer. Average dietary histories may be taken from a community or data may be obtained on the consumption of various foods by the community as a whole.

Colon Cancer

Established Factors

1. In the state of Connecticut, there has been an increase in colon cancer for both males and females since 1935, but the rates have been almost level since 1955 for males and 1950 for females. There has been practically no change in the rates of cancer of the rectum for both sexes for the corresponding years. Similar data exist for upstate New York.

2. Colon cancer occurs more commonly among American women than American men (ratio 0.8). A similar sex ratio applies to several European countries though in some areas of the world the disease is somewhat more common among males.

3. Rectal cancer is more common among American men than among American women (ratio 1.2). All countries report a predominantly male sex ratio.

4. There appear to be no uniform influences of socio-economic status on either colon or rectal cancer, as reported from the United States, England and Denmark.

5. In New York City Jews have more colon cancer than other religious groups whereas for rectal cancer there is no religious difference in death rates.

6. Haenszel and Dawson have shown that large bowel cancer is more common in the northern portions of the United States than in the central portion, the western portion or the southern portion.

7. In the United States large bowel cancer seems to be more common in urban than in rural areas.

8. Large bowel cancer, particularly of the colon, is relatively uncommon, especially in Japan and other Asiatic countries, and in South America, Africa and Eastern Europe.

9. Some epidemiological evidence indicates a negative correlation between the mortalities of gastric and colon cancer, suggesting opposing etiologic factors.

10. There is a definite association between familial polyposis and large bowel cancer.

11. A positive association appears to exist between the mortalities of colon cancer and arteriosclerotic heart disease.

12. Ulcerative colitis increases the risk for large bowel cancer. The longer the disease is present and the more area of the large bowel is involved, the greater the risk.

Suspected Etiological Factors

1. Constipation has been suggested by Wynder and Shigematsu to increase the risk of cancer of the colon. It particularly affects the portions reaching from the cecum through the descending portion of the colon in women and the sigmoid portion in men. The greater prevalence of constipation among American women is consistent with the greater frequency of colon cancer in American women. The effect of constipation, if real, is by no means large. No correlation was found between constipation and rectal cancer.

2. In a retrospective study Wynder and Shigematsu found a positive correlation between cigar smoking and cancer of, in particular, the sigmoid portion of the colon, as well as a negative correlation between cigarette smoking and this site for men. These correlations, in turn, appeared to be related to obesity. In the same study female patients with cancer of the colon also tended to be slightly heavier than control patients. The significance of these associations needs to be explored further by both retrospective and prospective studies.

3. Italo-Americans according to one study have a higher risk of cancer of the colon than other foreign-born groups.

4. Recto-sigmoid lesions present difficulties of localization but epidemiologically resemble colon rather than rectal cancer.

5. The finding by Boyd and Doll that patients with large bowel cancer had used liquid paraffin and vegetable-base purgatives more commonly than control patients needs to be explored further, particularly in regard to their relation to the degree of constipation.

6. The negative correlation of colon to gastric cancer, the positive association of colon cancer to arteriosclerotic heart disease and the relatively high rate of colon cancer among Jews in New York City may be related to a dietary pattern, possibly high in terms of saturated fats. The low rate of colon cancer, particularly in Japan, is also consistent with this view.

Recommended Future Studies

1. Epidemiological information should be obtained separately for the various parts of the large bowel.

2. Joint epidemiological studies of Japanese in Japan and Japanese immigrants to the United States should be conducted.

3. Epidemiological studies should be carried out on Caucasians, Africans and other ethnic groups in South Africa, among whom there are differences in the frequency of large bowel cancer.

4. Combined epidemiological and biochemical studies, such as obtaining blood cholesterol levels and determining fecal fats, should be done on patients with large bowel cancer.

5. Epidemiological studies should be conducted on polyps of the large bowel. Prospective studies may be in order on patients with proved polyps of the large bowel for whom information on dietary factors, smoking factors and large bowel habits can be obtained.

6. The suspected association of myocardial infarction and colon cancer should be explored further, particularly as they may relate to a third variable. Similarly, the negative association suggested by some epidemiological evidence for gastric and colon cancer should be studied further.

7. Laboratory studies should investigate the production of large bowel cancer in the experimental animal, simulating human dietary patterns thought to be associated with large bowel cancer. The hamster may be the animal of choice.

Discussion

The major leads to the etiology of gastro-intestinal-tract cancer come from the incidence and frequency distribution of these cancers throughout the world and in various population groups. That few exogenous factors among the many studied have been definitely identified as affecting the development of these cancers may suggest that endogenous factors play an important role. The conferees felt that dietary factors probably have an important influence on the development of both gastric and large bowel cancer. It is apparent that dietary factors, whether in respect to excesses or deficiencies, are difficult to identify. It is possible that the total dietary pattern is more important etiologically than any single food item.

The committee agreed that laboratory studies could assist in pin-pointing the dietary factors, provided of course that a laboratory animal could be found that would react to dietary factors in a way similar to man. The conferees judged that combined epidemiological and laboratory studies are in order, not only because such studies might identify dietary factors more definitely and thus lead to preventive measures but also because they might contribute significantly to our understanding of the pathogenesis of gastro-intestinal cancers.

—Ernest Wynder, MD
—Saxon Graham, PhD
—Henry Eisenberg, MD

References

No references were attached because these areas have been well reviewed by a number of investiga-

tors. In instances where specific names are mentioned as support either these data have been presented or unpublished data have been given.

APPENDIX—Members of the Research Committee Present at the June 1965 Meeting

Dr. Thomas Almy, New York, N.Y.
Prof. Mihailo Andrejevic, Belgrade, Yugoslavia
Dr. Clifford Barborka, Chicago, Ill.
Dr. John Berg, Bethesda, Md.
Dr. A. Pena Chavarria, San Jose, Costa Rica
Dr. John Dunn, Berkeley, Calif.
Dr. Henry Eisenberg, Hartford, Conn.
Dr. Saxon Graham, Buffalo, N.Y.
Dr. E. Grossmann, Caracas, Venezuela
Dr. Cuyler Hammond, New York, N.Y.
Dr. John Higginson, Kansas City, Kans.
Dr. Thomas Hunt, London, England
Dr. Lyon Hyams, New York, N.Y.
Dr. M. J. S. Langman, London, England
Dr. Brian MacMahon, Boston, Mass.
Dr. Gordon McNeer, New York, N.Y.
Dr. David Schottenfeld, New York, N.Y.
Dr. Wendell Scott, St. Louis, Mo.
Dr. Takao Shigematsu, Yonajo, Japan
Dr. Grant Stemmermann, Honolulu, Hawaii
Dr. Olga Vlachmirolnu, Moscow, U.S.S.R.
Dr. Ernest L. Wynder, New York, N.Y.

(The figures may be seen in the original article.)

INTRAVENOUS LOSS OF POLYETHYLENE CATHETERS

Carl E. Northcutt MD, Stuttgart, Arkansas, GP 34(6): 125-127, December 1966.

Polyethylene catheters have found increasingly wide application as a means of providing prolonged intravenous fluid therapy. Complications include loss of a portion of the catheter into the vein, thrombosis and infection. Some of the lost catheters have found their way to the heart and produced perforation, thrombus formation or endocarditis. To prevent complications, aseptic technique must be followed and lost catheters should be promptly retrieved.

Manufacture of radiopaque catheters would facilitate recovery.

Intravenous polyethylene catheters are used widely in hospital practice. They have their greatest usefulness in the restless patient, the very sick patient and the patient who requires prolonged intravenous fluid therapy. The purpose of this article is not to criticize the use of catheters but to point out some of the problems which may be encountered and to make recommendations to prevent complications.

Reported Cases

Relatively few cases of lost catheters have appeared in the literature. These cases probably represent only a small percentage of the actual number. The first case of intravenous loss of a polyethylene catheter was reported by Turner and Sommers in 1954. They described the loss of a catheter into a cubital vein. Autopsy two days after loss of the catheter revealed that the patient died of acute myocardial infarction secondary to occlusion of the right coronary artery. The catheter was found in the right atrium and extended up the superior vena cava for a distance of 18 cm. At the level of the end of the catheter, on the anterior wall of the right atrium, there was a mural thrombus measuring 2 cm. in diameter.

The second case of a lost catheter was reported by Brown and Kent. They described a case in which a polyethylene catheter, being used for intravenous therapy in a 27-year-old patient, accidentally escaped into the left femoral vein. The patient died 71 days later of cardiac tamponade resulting from perforation of the right ventricle by the catheter. In some instances, it is likely that the bevel of the needle nicks the catheter at the time of insertion. This is most likely to occur in the restless patient.

Ayers reported a case of a polyethylene catheter lying in the right atrium and serving as the origin of a severe episode of acute bacterial endocarditis with secondary pulmonary abscesses. Moncrief, reporting on his extensive experience with femoral catheters for intravenous fluid therapy, cited three cases in which a portion of the polyethylene tube was lost in the vascular system. One patient was alive and asymptomatic two years after the catheter was lost. The other two patients died of septic thrombophlebitis directly attributable to the retention of the polyethylene tubing.

Illustrative Case

A 61-year-old man was taken to the operating room for removal of a pheochromocytoma from the right adrenal gland. A polyethylene catheter was being inserted into a superficial vein of the left forearm when it was noted that a hematoma was developing 2 cm. proximal to the site of the needle puncture. This occurred while the catheter was being threaded through the needle. During the attempt to manipulate the catheter into the vein, the hematoma became larger. The needle and catheter were withdrawn and it was noted that the distal 4 cm. of the catheter was missing. A tourniquet was quickly ap-

plied to the left arm at the level of the axilla. Palpation revealed what was thought to be the catheter in a vein at the level of the antecubital fossa. An incision was made but the catheter could not be demonstrated.

The patient soon developed frequent paroxysmal ventricular contractions. Subsequently, wandering pacemaker occurred and then atrial fibrillation. The patient became hypotensive. The hypotension was corrected rapidly with a small amount of levarterenol. The patient then stabilized but a few paroxysmal ventricular contractions persisted for 48 hours. He was discharged two days later and had no further difficulty.

Four weeks after discharge, the patient was readmitted to the hospital and, with use of general anesthesia, a large pheochromocytoma was removed from the right adrenal gland. Shortly after removal of the tumor, the patient went into profound shock and died. The catheter was found coiled in the right atrium. Because of open chest cardiac massage, the exact location of the catheter could not be ascertained. It was impossible to determine whether the catheter had caused any local endocarditis. There was no evidence of a thrombus in the catheter.

Complications

An intravenous or intracardiac foreign body, even though it is an inert and sterile plastic tube, is a serious problem. It is well to keep in mind all of the following complications which have occurred when polyethylene catheters were lost in the venous system: thrombosis, embolism, bacterial endocarditis, perforation of the right ventricle with secondary cardiac tamponade, pericardial effusion, mural thrombus formation, edema of the extremity, erosion of the vein wall, lung abscess and death.

Removal of Foreign Bodies

Although not concerned with plastic catheters, a large series of cases of intracardiac foreign bodies was presented by Harken and Zoll in 1946. These authors pointed out that foreign bodies should be removed from the heart and blood vessels to prevent embolus of the foreign body, to reduce the danger of bacterial endocarditis, to prevent recurrent pericardial effusion and to diminish the incidence of myocardial damage. They also mentioned the additional factor of cardiac neurosis.

The first case of successful removal of a polyethylene catheter from the heart was reported by Trusler and Mustard in 1958. An 18 cm. length of

tubing had passed from a left cubital vein to the superior vena cava and right atrium of a 10-year-old child. It was successfully removed through a small incision in the superior vena cava. Trusler and Mustard stressed the need for early removal to prevent the complications which can occur. They also recommended the right atrium, rather than the superior vena cava, as the best site for an exploratory incision.

Diagnosis

An abnormal electrocardiogram or chest film is helpful in determining the location of a lost catheter. The electrocardiogram may be normal in the presence of an intracardiac catheter. The use of contrast media as a diagnostic aid could be dangerous because of the possibility of the media displacing the catheter along the vein and into the heart. Lost catheters could be easily located, however, if they were radiopaque.

Recommendations

The following procedures are recommended to prevent the complications noted previously:

1. Always observe sterile technique.
2. Do not insert catheters at joints.
3. Do not leave catheters in place more than 48 hours. The incidence of infection can be expected to rise sharply after this time.
4. Do not insert catheters into deep veins unless necessary.
5. Use arm splints.
6. Make a single loose loop knot in the exposed portion of the catheter.
7. Place a drop of collodion on the skin and the catheter at the site where the catheter enters the skin. The use of a topical antibiotic (e.g., polymyxin or neomycin) over the exposed portion of the catheter may also inhibit development of infection.
8. Do not use a catheter if a regular needle will suffice.
9. Changes by manufacturers are needed to improve the safety of polyethylene catheters. All catheters should be radiopaque.
10. The inner surface of the bevel of the needle should be dull.
11. If a catheter is lost, it should be located and removed as soon as possible.

CHRONIC HEMODIALYSIS USING VENIPUNCTURE AND A SURGICALLY CREATED ARTERIOVENOUS FISTULA*

Michael J. Brescia MD,† James E. Cimino MD,‡ Kenneth Appel MD,§ and Baruch J. Hurwich MD,† Bronx, New York. New Eng J Med 275(20): 1089-1092, November 17, 1966.

The success of chronic hemodialysis in terminal renal failure depends on repeated access to blood vessels that will provide a continuous flow of up to 250 to 300 ml. per minute.

A technic was developed for the permanent implantation of cannulas into an artery and vein of the forearm. Between dialyses, patency of these blood vessels depends on maintaining circulation between artery and vein by means of a Teflon-Silastic loop, creating an external arteriovenous fistula. The surgical technic required for the successful implantation of these catheters has been described. This prosthesis is now used by virtually all centers engaged in chronic hemodialysis.

The prosthesis, however, has serious disadvantages. The external cannulas have a limited period of usefulness, usually measured in months. The major causes of cannula failure are clotting and infection. Septicemia and pulmonary emboli are not infrequent sequels to phlebitis or cellulitis affecting the cannula site. Dislodgement of the cannulas with subsequent massive arterial bleeding, can occur, as can pressure necrosis of the skin overlying the subcutaneous Teflon or Silastic tubing. With or without complications, psychologic fixations on the cannulas have developed. Daily cannula care involving hexachlorophene (pHisoHex) scrubs and dressing changes takes time, and the cost of cannula components is not insignificant.

In our experience complications involving the external shunts have been the greatest cause of morbidity in patients undergoing chronic dialysis. More-

* From the Renal Service, Dialysis Unit, Veterans Administration Hospital (requests for reprints should be addressed to Michael J. Brescia, M.D., at the Renal Service, Dialysis Unit, Veterans Administration Hospital, Bronx, New York).

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§ Attending surgeon, Surgical Service.

over, cannula surgery or revisions, along with treatment of infections and clotting, were responsible for most inpatient hospital days.

Prompted by our previous success with venipuncture technics for chronic dialysis and disappointed with the external shunt, we considered the possibility of creating an arteriovenous fistula surgically to assure a blood flow of 250 to 300 ml. per minute within the venous channels. The radial artery and any available vein in the forearm were utilized.

Surgical Technic

Surgery is performed under local anesthesia. A 3.0-cm. incision is made over the area of the radial pulse. The radial artery is mobilized. Small arterial branches are divided and ligated. The largest available neighboring vein is similarly mobilized. Approximately 3.0 cm. of each vessel should be free so that sharp angulation does not occur when the vessels are brought side to side. Handling of the vessels is facilitated by the use of No. 00 silk as encircling tapes; these tapes also offer sufficient control of the vein to prevent bleeding. The artery is occluded by small atraumatic clamps. A longitudinal incision, 0.3 to 0.5 cm., is made in corresponding lateral surfaces of the artery and vein. A side-to-side anastomosis is performed with the use of No. 0000000 arterial silk in a continuous fashion. The tapes and clamps are removed, and a thrill usually is immediately palpable at the site of the fistula. The procedure is facilitated by the use of an ophthalmic loupe. Slight swelling of the hand may be noted for a few days after operation, but it recedes spontaneously, especially with slight elevation. Dialysis may be performed the day following surgery.

Dialysis Technic

The patient with a fistula between radial artery and vein is prepared for dialysis by a tourniquet placed on the upper arm and left in place for thirty seconds; this is sufficient time to allow venous engorgement. Two sites are selected for venipuncture. These should be as far apart from each other as is convenient, preferably not in the antecubital fossa, though they may be nearly adjacent. We recommend using the cephalic vein in the upper arm for the proximal site. The distal venipuncture site is usually located in the forearm just below the antecubital fossa to permit arm mobility during dialysis. For reasons of comfort or accessibility these sites may be varied from one dialysis to the next. One percent procaine is injected intradermally through a No. 26 needle into the venipuncture sites; 2 small wheals

approximately 0.5 cm. in diameter are produced. Venipuncture is performed in the proximal site with a 14-gauge, thin-walled needle, which is then advanced within the vein as far as possible. The tourniquet is released, and the needle attached to an Abbott Venetube Twinsite. These are securely fastened to the arm by strips of adhesive tape, 1.3-cm. wide, and the Twinsite is attached to a slow intravenous drip of 5 percent dextrose in water. The tourniquet is reapplied below the proximal needle, and the distal venipuncture is performed in the manner described above, except that the needle bevel may be pointed distally, toward the hand, if so desired. (As time has passed, we have noted that the vessels have become even more prominent and thick-walled, making venipuncture even easier; this "arterialization" is caused by prolonged exposure to arterial pressure and flow.) The Twinsites are disconnected from the intravenous drip, and the precalculated dose of aqueous heparin is injected directly into either Twinsite. The dialyzer tubing and the Twinsites are connected in the standard manner, the distal needle being used for withdrawal of blood from the patient for delivery into the dialyzer, and the proximal needle for return to the patient. The Twinsites prevent movement of the needles during dialysis and facilitate withdrawal of blood from either side of the dialyzer and administration of heparin and other medications. For blood flows in excess of 250 ml. per minute a tourniquet is occasionally necessary, applied lightly, between the needles. Less than five minutes are generally required from the beginning of venipuncture to the initiation of dialysis. At the end of dialysis, both needles are removed, and a secure pressure bandage is applied over each puncture site. This is accomplished in one or two minutes. The dressings are discarded by the patient at home after several hours.

Results

Thirteen of the 16 patients treated in our unit have been dialyzed by means of the fistula between radial artery and vein, for a total of 110 dialysis months and over 800 dialyses as of July 1, 1966 (Table 1). The remaining 3 have conventional external shunts. Only 2 fistula attempts have been unsuccessful: one on L. L., whose fistula never functioned, probably owing to venous thrombosis, and who now has an external shunt*: and one on G. A.,

* In this patient a skin erosion developed over the arterial subcutaneous silastic loop of the Scribner shunt. This was complicated by a purulent discharge due to *Staphylococcus aureus*, coagulase-positive, from the wound. On August 16, 1966, the Scribner shunt was removed, and an arteriovenous fistula created in the right arm. The fistula is functioning perfectly, and dialyses are now being performed by means of venipuncture technic.

TABLE 1. Total Experience with the Use of Arteriovenous Fistulas with Venipuncture Technic for Chronic Hemodialysis at the Bronx Veterans Administration Hospital Dialysis Unit as of July 1, 1966.*

Patient	Age	Diagnosis	Period on Chronic Hemodialysis mo.	Date Fistula Created	Period in Use mo.	Total Dialyses Using Fistula	Complications
G.A.	54	Chronic pyelonephritis; chronic glomerulonephritis.	19	2/19/65	0	0	Fistula made too small & never functioned
J.S.	28	Chronic glomerulonephritis.	10	3/21/66 3/9/65	3½ 8	30 40	None (patient died—see text)
F.G.	37	Chronic glomerulonephritis.	15½	3/19/65	15½	113	None
A.M.	43	Chronic glomerulonephritis.	24	3/24/65	15½	140	None
G.B.	44	Chronic glomerulonephritis.	17	3/26/65	15	125	None
C.H.	49	Chronic glomerulonephritis.	16	4/16/65	14½	121	None
L.L.	40	Chronic glomerulonephritis.	12½	7/22/65	0	0	Arteriovenous fistula never functioned
B.J.	45	Chronic glomerulonephritis.	15½	8/4/65	11	77	None
M.G.	46	Polycystic renal disease.	10½	8/27/65	10	48	None
J.F.	43	Chronic glomerulonephritis.	14½	9/10/65	10	64	None
W.P.	46	Chronic glomerulonephritis.	19	3/24/66	3	30	None
G.H.	49	Chronic glomerulonephritis.	13	3/21/66	3	26	None
S.D.	37	Chronic glomerulonephritis.	½	6/20/66	½	2	None
W.L.	45	Chronic glomerulonephritis.	½	6/21/66	½	2	None

* Total of 14 patients dialyzed with use of fistula, 14 fistulas in use for total of 110 mo. & dialyses using fistulas totaled 818.

whose initial fistula was too small and resulted in inadequate flow, but in whom a second attempt succeeded. Our unit uses the Kolff Twin-Coil dialyzer exclusively.

Once established successfully surgically, every arteriovenous fistula has continued to function without complication. The fistulas deliver blood at flow rates of 250 to 300 ml. per minute for unlimited intervals. There has not been a single episode of fistula clotting. There has been no local discomfort or infection, and no episodes of septicemia or pulmonary emboli have occurred. Accidental immersion and hemorrhage are not a problem. Previous social and occupational inhibitions and hazards are largely removed by the absence of external cannulas, and pa-

tients may enjoy essentially free use of their arms in their occupational pursuits.

The major disadvantage of any arteriovenous fistula, internal or external is an increased cardiac output. In spite of anemia and underlying heart disease, heart failure has not been a problem since the performance of an arteriovenous fistula. Cardiac function has either remained stable or improved in all the patients. The circulation times with dehydrocholic acid (arm-to-tongue method, with injection into the arm without the fistula) have been twelve to sixteen seconds. Temporary obliteration of the arteriovenous fistula has not slowed the heart rate (Branham's sign). Though no doubt there has been an increased cardiac output owing to the fistula, it has had no clinical significance.

The potential hazard of bacterial endarteritis and coincident endocarditis with an arteriovenous fistula has been reported. Unlike our experience and that of others with external cannula shunts, we have had no definite evidence of endarteritis or phlebitis. The only death occurred from acute bacterial endocarditis with rheumatic aortitis and mitral valvulitis after ten months of uncomplicated dialysis. Unfortunately, the fistula between radial artery and vein was not explored, so that we cannot rule out endarteritis.

Summary and Conclusions

Prolongation of life in terminal renal failure depends upon access to blood vessels for repeated hemodialysis. The Scribner shunt provides one method for repeated hemodialysis. However, serious problems with the maintenance of this type of shunt and a high incidence of infection and clotting have led to the development of an equally practicable technic for repeated dialysis. We have successfully used a combination of a surgically created fistula between

radial artery and vein and venipuncture using 14-gauge, thin-walled needles for over 800 dialyses in 13 patients. We believe that this technic provides a dependable method for repeated access to vessels for hemodialysis and largely removes the clinical and psychologic problems associated with external Silastic-Teflon shunts.

We are indebted to the following members of the staff of the Dialysis Unit for enabling its success and the success of our new technic through their unstinting, devoted work: Mr. Ruben Aboody, chief technician; Miss Gwendolyn Kolesha, chief nurse; Mr. Michael Giannone, technician; Mrs. Doris Lustig, nurse; and Miss Kathleen Weadock, secretary. We are especially indebted to Dr. Julius Wolf, chief, Medical Service, for his unfailing support and guidance of the chronic-dialysis program, to Mr. Lawrence Steur, photographer, and to Mr. David Lubin, chief, Medical Illustration Department, for the excellent photographic material.

(The omitted figures and references may be seen in the original article.)

DEFINITIVE TREATMENT OF 536 CASES OF HYPERTHYROIDISM WITH I-131 OR SURGERY

H. Taylor Caswell MD, Robert R. Robbins MD and G. P. Rosemond MD, From the Departments of Surgery and Radiology, Temple University School of Medicine and Hospital, Philadelphia, Pennsylvania. Ann Surg 164(4): 593-599, October 1966.

Prior to the introduction of I¹³¹ as a therapeutic agent in 1948 the only definitive treatment of thyrotoxicosis available was subtotal thyroidectomy. The apparent simplicity of treating hyperthyroidism with I¹³¹ and the rather impressive immediate results caused a marked decrease in the number of toxic patients treated surgically. This decrease in operative surgery for a toxic disease was also due in part to a lack of interest in the advances in thyroid physiology and therapy by surgeons and a surgical technic which led to some unacceptable postoperative complications. The development of such attitudes is detrimental to the patient with thyrotoxicosis, for experience has shown that both methods of treatment have merit on an individualized basis.

Material and Methods

The 536 patients reported in this study include 319 patients treated with I¹³¹, 208 patients treated surgically and nine patients treated by a combina-

tion of both methods during the period 1950-1963. Both ward and private patients were included. Surgical procedures were done by staff surgeons and fourth-year surgical residents. All patients were treated at the Temple University Hospital by the departments of Surgery, Medicine and Radiology.

Distribution of patients and their median age is listed in Table 1. Diffuse toxic goiter was about three times as common as nodular toxic. Fourteen percent of the patients were hyperthyroid without goiter. There were six times as many females as males in the series. Seventy-eight percent of all patients were white.

Principal indications for I¹³¹ therapy were patients over 40, recurrent hyperthyroidism after operation, prohibitive surgical risk, sensitivity to antithyroid drugs, and refusal of surgical treatment.

Average dosage for diffuse toxic goiter was 7 mc. and for toxic nodular goiter 12 to 15 mc. I¹³¹.

Presented before the American Surgical Association, March 23-25, 1966, Boca Raton, Fla.

TABLE 1. *Types of Cases Treated and Median Age (1950-1963)*

	Cases	Median Age
Diffuse toxic goiter	366	
I ¹³¹	217	42
Surgery	149	33
Nodular toxic goiter	127	
I ¹³¹	59	55
Surgery	68	46
Hyperthyroidism without goiter	73	
I ¹³¹	60	53
Thyroiditis with hyperthyroidism	1	
Carcinoma with hyperthyroidism	1	
Total	536*	
I ¹³¹	319	45
Surgery	217	36

* Nine patients treated by a combination of both methods.

Principal indications, although by no means always followed, for choosing surgical treatment rather than I¹³¹ were patients under 40, toxic nodular goiter and adolescent goiter, and failure to respond to antithyroid drugs.

Of 217 patients, 212 were prepared for surgery with antithyroid drugs. Iodine was given in five patients. Methimazole (Tapazole®) was the drug of choice. The average initial dose was 60 mg./day. In severely toxic patients as much as 80 or 100 mg./day was given as the initial dose. The drug was continued until the patient was euthyroid and was followed by 17 days of Lugol's iodine, 10 drops three times daily. Operation in most instances was carried out under endotracheal anesthesia.

In diffuse toxic goiter a wafer of thyroid tissue 1.0 x 0.7 x 0.3 cm. was left on each side of the trachea. As in all surgically treated patients, hyperthyroidism was controlled prior to operation, within an average of 4 to 6 weeks.

In patients with nodular toxic goiter, if preoperative scan revealed a hyperfunctioning nodule with suppression of the remainder of the gland, only the nodule was removed.

Results and Discussion

Surgical Complications. Permanent unilateral recurrent nerve paralysis occurred in one patient. There were no cases of permanent hypoparathyroidism. Four patients had postoperative bleeding which required reopening the cervical wound. There

was one hemolytic streptococcal wound infection and two staphylococcal wound infections. Three patients showed mild to moderate thyroid storm postoperatively which responded promptly to intravenous iodine and hydrocortisone. There were no deaths as a result of the surgical procedure.

Relationship of I¹³¹ to Thyroid Carcinoma, Leukemia and Genetic Defects. The theoretical objection to I¹³¹ on the basis of subsequent development of carcinoma or leukemia has not been substantiated statistically by the experience of the past 15 years. Although isolated cases of thyroid carcinoma and of acute leukemia have been reported they cannot be considered as statistically significant. There is no evidence of genetic defects resulting in the birth of abnormal children in females who received I¹³¹ for treatment of toxic disease as children. The significance of chromosomal abnormalities occurring in patients receiving I¹³¹ is undetermined. However, the fact that the incidence of permanent myxedema rises steadily over a 10-year period after therapy with I¹³¹ proves the long-term effect of I¹³¹ on the thyroid cell. Thyroid carcinoma may require a longer period for development than the 15 years during which I¹³¹ has been employed extensively. These factors should be considered before administering the drug to young people. I¹³¹ should not be used during pregnancy because of its ability to destroy fetal thyroid.

It is also most likely that the birth of an abnormal child, of any type, to a female who had received I¹³¹ will be ascribed by the parents to the use of the isotope, although there is no scientific evidence for such a relationship.

Major Disadvantages of I¹³¹. Principal objections to the treatment of hyperthyroidism with I¹³¹ are 1) the time required to gain control of the disease and 2) the incidence of permanent myxedema. About 25 percent of patients treated with I¹³¹ will require more than one dose of the drug, about 35 percent will require more than 3 months to gain control and in about 10 percent of all patients control will not be established (Tables 2, 3).

Prolongation of hyperthyroidism involves marked physical disability and the threat of thyroid storm in patients becoming pregnant or with severe intercurrent illness. Every patient with thyrotoxicosis has a major emotional disturbance as part of the disease. If control is not promptly established they respond poorly to such disappointment and are most difficult to follow and treat further.

TABLE 2. *Time Required to Control Disease with I¹³¹*

	Diffuse Toxic	Nodular Toxic Goiter	Hypothyroidism without Goiter
<3 months	58%	53%	49%
>3 months	35%	33%	42%
>5 months	14%	22%	14%
No control	7%	14%	9%

TABLE 3. *Number of Doses Required in Treatment of Hyperthyroidism with I¹³¹*

	1 Dose	2 Doses	3 + Doses
Diffuse toxic	77%	17%	6%
Nodular toxic	75%	15%	10%
Without goiter	86%		14%

Permanent myxedema occurred in 15 percent of patients treated with I¹³¹ in this study (Table 4). It is likely that a more detailed evaluation of each patient would show a higher incidence. The low incidence of permanent myxedema in our group compared to other series may be explained partially by the low initial dosage of I¹³¹ (7 mc. in diffuse toxic goiter and 12 to 15 mc. in nodular toxic goiter).

Dunn and Chapman report a 43 percent incidence of myxedema in patients followed 10 years. The incidence of hypothyroidism increased at a rate of 2 to 2.9 percent per year after I¹³¹ therapy. Starr *et al.* reported a 60 percent incidence of hypothyroidism in children and adolescents receiving I¹³¹ therapy. Cassidy and Astwood reported a 14.5 percent incidence of hypothyroidism in patients evaluated for 1 to 7 years. Behring and Einborn found a 26.5 percent incidence of hypothyroidism 7 years after I¹³¹ therapy. Green and Wilson report a 29 percent incidence of hypothyroidism after 10 years without any indications of a plateau. The rising incidence of hypothyroidism over a 10-year period after I¹³¹ therapy means that there has been genetic damage to successive generations of thyroid cells over a prolonged period.

TABLE 4. *Results of Treatment in 527 Patients*

	Good	Fair	Poor	Recurrence	Myxedema
I ¹³¹ (319)	80%	10%	10%	4%*	15%**
Surgery (208)	88%	9%	3%	3%***	4%

* Includes all patients who became euthyroid regardless of the number of doses of I¹³¹.

** On the basis of patients receiving thyroid replacement therapy. The decision made by Dept. of Radiobiology.

*** All in patients with diffuse toxic goiter.

Although hypothyroidism after I¹³¹ therapy can be controlled by oral thyroid extract, this requires complete and faithful cooperation, which often is not received. Hypothyroidism can result in an insidious chronic disease characterized by fatigue, loss of mental acuity, excessive weight gain and cardiovascular complications. It cannot be regarded as a minor, easily managed postoperative complication.

Surgical Treatment of Hyperthyroidism. Major advantages of the surgical treatment of hyperthyroidism compared to I¹³¹ therapy are prompt control of the disease and a low incidence of permanent myxedema, 4 percent in this series, which does not rise with time as does I¹³¹.

The patient can be brought to a euthyroid state with antithyroid drugs and iodine without hospitalization. Thyroidectomy can then be carried out promptly after admission and the hospital stay averages 4 to 5 days.

Operation is performed on a euthyroid patient and the problem of major thyroid storm should not occur. The surgical risk is less than 1 percent, primarily that of anesthesia. Recurrence rate is low (3%) and 88 percent of the patients treated surgically in this series classified their result as good (Table 4).

Postoperative complications of permanent hypoparathyroidism or recurrent nerve injury should never occur when proper surgical technic employing visualization of these structures is made routine. Anesthesia must be expert. In most patients endotracheal anesthesia should be used and particular care should be taken to avoid traumatic injury to the laryngeal and tracheal mucosa. This type of mucosal injury can result in annoying hoarseness and cough for several months after operation.

Treatment of Diffuse Toxic Goiter. Uptake of I¹³¹ in patients with diffuse toxic goiter is high and isotope is distributed evenly throughout the gland. Radiation destruction of the acinar cells is effectual and in this series 58 percent of the patients treated were euthyroid in 3 months or less. Failure to effect control occurred in 7 percent of these patients (Table 2). The conservative attitude at present recommends the use of I¹³¹ in patients over 40 with diffuse toxic goiter, eliminating younger patients primarily because of the high incidence of myxedema. The remote possibility of causing thyroid neoplasm and the unproved relationship to genetic defects play a minor part in this decision. It is also the treatment of choice in recurrent thyrotoxicosis after thyroidectomy primarily because of the risk of recurrent nerve or parathyroid damage, in patients who are

prohibitive surgical risks, in patients who cannot be prepared for operation with antithyroid drugs and in patients with hyperthyroidism without goiter who have not responded to long-term antithyroid drug therapy. The recurrence rate is low (3%) and there is no anesthetic or surgical morbidity or mortality.

Diffuse toxic goiter in adolescence is best treated initially by antithyroid drugs on a long-term basis in order to gain remission. If such management is not successful then operation should be performed. Repeated attempts to gain remission with antithyroid drugs are rarely successful.

Treatment of Nodular Toxic Goiter. In toxic nodular goiter the uptake of I^{131} is usually less than in diffuse toxic goiter and the distribution of the isotope throughout the gland is spotty. In this series control could not be established in 14 percent of the patients treated (Table 2) and there was a recurrence rate of 15 percent. Most authors recommend operation as the treatment of choice for nodular toxic goiter. I^{131} should be reserved for those patients who are extremely poor surgical risks.

Treatment of Hyperthyroidism without Goiter. Results in these patients paralleled those of diffuse toxic goiter. There is a question as to whether this group should not be treated with antithyroid drugs

on a long-term basis in an effort to gain remission prior to treating definitely with I^{131} .

Summary

From 1950 to 1960, 527 patients with hyperthyroidism were treated by I^{131} (319), subtotal thyroidectomy (208) or both (9).

Twenty-eight percent of patients given I^{131} therapy required more than one dose and more than 14 percent required more than 5 months to control the disease. Patients with nodular toxic goiter respond poorly to I^{131} , primarily because of poor uptake of the isotope. The incidence of myxedema in the I^{131} treated group was 15 percent; in the surgically-treated group it was 4 percent. Permanent recurrent nerve paralysis or hypoparathyroidism did not occur in the surgical group. Three patients developed post-operative thyroid crisis and all recovered.

Results were classed as good in 80 and 88 percent of patients treated by I^{131} and surgery, respectively.

Surgery is the treatment of choice in patients with nodular toxic goiter and should be used in the majority of patients under 40.

(The references may be seen in the original article.)

A PHYSIOLOGICAL CONCEPT OF CHOLESTEROLAEMIA

Rahmat U. Qureshi and Adrian J. Salter, Department of Nutrition, Queen Elizabeth College (University of London), Sir John Atkins Laboratories, Campden Hill, London, W.8. Nature 212(5064): 789-791, November 19, 1966.

Since the original discovery of cholesterol in the body by Boudet in the early part of the nineteenth century the presence of this compound has been demonstrated, mostly in a dynamic state, as a normal constituent of all living cells. Many workers have observed that the levels of cholesterol in tissues are altered by changes in the diet, environment and a number of diseases. We believe that two main factors influence the formation of cholesterol: first, the demand for the products of its catabolism, and second, an abnormality in lipid metabolism.

Formation of cholesterol in the body. It was considered by Anitschkow and others that exogenous cholesterol alone was responsible for a rise in serum cholesterol in rabbits, but later evidence demonstrated the endogenous synthesis of cholesterol in mice from small carbon units. Shortly afterwards Bloch and Rittenberg, in 1942 and 1945, identified

acetate as the precursor substance in the biosynthesis of cholesterol. Since then successive discoveries of squalene, lanosterol and mevalonate as precursors of cholesterol have been important events. Now it is known that cholesterol is readily synthesized in the body from acetate through these intermediates.

Kempner in 1949, and others, all showed that low fat diets depressed the serum cholesterol content of persons with hyper-cholesterolaemia. In this investigation of different racial groups in 1956, Keys observed that in areas where fat intake was high hyper-cholesterolaemia was common, and where fat intake was low serum cholesterol values in the population were also low. Kinsell *et al.* in 1952 showed that the consumption of vegetable oils lowered the serum cholesterol whereas animal fats raised it, and this was subsequently confirmed by other workers.

Furthermore, of the vegetable oils, those containing polyunsaturated fats were found to be more effective for reducing serum cholesterol. As a result of this the attention of the later workers was mainly focused on the amount and type of dietary fat with respect to cholesterolaemia.

Evidence is now rapidly accumulating to show that the amount and type of carbohydrate have a profound influence on cholesterol metabolism. Carbohydrates through pyruvate, proteins after deamination, and fatty acids after oxidation, are all catabolized to acetyl coenzyme A (CoA). The major portion of the acetyl CoA pool satisfies basal requirements and energy needs of the body, and its smaller portion goes towards the biosynthesis of substances such as cholesterol. As will be seen from Fig. 1, (omitted) the glycogen and adipose tissue formed are in dynamic equilibrium with the acetate pool but cholesterol formed from the acetate pool is not. This is supported by the fact that cholic acid labelled with tritium is not converted into cholesterol in the rat and that cholic acid 24-C is not changed into less hydroxylated bile acids. On this evidence it has been suggested that the conversion of cholesterol to cholic acid in the intact animal progresses in only one direction.

Formation of bile acid from cholesterol. Bloch *et al.* were the first to investigate the conversion of cholesterol to bile acids. Later, Zabin and Barker proved the formation of cholic acid from cholesterol in the bile-fistula dog, and Byers *et al.* confirmed the breakdown of cholesterol to bile acids in the rat. Siperstein *et al.* showed that bile acids are the final end-products of cholesterol metabolism, as much as 95 percent of the administered radioactive cholesterol being recovered from the faeces, and of that more than 80 percent was in the form of bile acids. Later, it was reported that in a man with a biliary fistula 98.5 percent of the cholesterol-4-C excreted was present as bile acids, mainly cholic acid, and the same authors have pointed out that cholesterol is probably the only precursor of bile acids.

Quality of fat and cholesterolaemia. If the amount of fat present in the diet increases there will be correspondingly greater need for bile acids for its emulsification and absorption; because bile acids are the catabolic products of cholesterol there will be indirectly a greater need for cholesterol to deal with the increasing dietary fat load. Increased synthesis of cholesterol as a result of high fat intake is, therefore, a matter of physiological necessity, but it has been observed that saturated fats are hyper-cholesterolaemic compared with unsaturated fats.

Gordon *et al.* in 1957 found that unsaturated fats increased the rate of bile acid excretion, and other workers discovered that butter oil decreased and corn oil increased faecal sterol excretion, this being confirmed later. It was found that linoleic acid supplementation increased the faecal excretion of bile acids and sterols which could be precipitated by digitonin. It has also been hypothesized that the accumulation of cholesterol in the liver in fat deficiency results from a lack of linoleate for proper esterification and transport of cholesterol from the liver. The bulk of evidence favours the fact that polyunsaturated fats, particularly linoleic acid, in the diet lower the serum and liver cholesterol by increasing the rate of its catabolism to bile acids and neutral sterols.

On the other hand, the stimulatory effect of polyunsaturated fats on cholesterol biosynthesis has been demonstrated in rats, and it has also been found that cholesterol synthesis from acetate *in vitro* in liver slices is highest in rats receiving cottonseed oil or methyl linoleate and reduced to about one-tenth as much in animals receiving a diet containing hydrogenated coconut oil.

The concentration of cholesterol in the blood will depend on the resultant of both synthesis and breakdown. It has been seen that dietary fat, of whatever kind, increases synthesis of cholesterol. Unsaturated fats, however, decrease the level of cholesterol in blood by increasing its rate of catabolism and the excretion of its breakdown products in faeces. As a result, this will induce the increase in the rate of cholesterol synthesis which has in fact been observed. This increase is clearly not sufficient, however, to match the rate of breakdown and excretion, so that it must be postulated that unsaturated fats increase breakdown of cholesterol more than they increase its synthesis. A few exceptions have been reported where the concentration of cholesterol does not drop despite feeding certain unsaturated fats, such as mustard seed oil in which erucic acid forms 45-50 percent of its total fatty acids. In this case breakdown does not exceed synthesis, probably as a result of the presence of a long chain fatty acids. It appears that esterification of cholesterol and therefore its subsequent disposal proceeds more favourably with unsaturated fatty acids rather than saturated or long chain fatty acids.

Cholesterolaemia after feeding cholesterol and bile acids. Feeding of cholesterol, cholic acid and deoxycholic acid has been shown to affect serum and liver cholesterol.

It has been demonstrated that cholesterol feeding inhibits cholesterol synthesis both *in vivo* and *in vitro*, and Alfin-Slater *et al.* have suggested that this results from an increase in the concentration of liver cholesterol. Feeding with cholesterol, therefore, increases liver cholesterol and because of this the concentration of serum cholesterol is elevated and remains high until the rate of its catabolism is sufficiently increased.

Feeding with cholic acid has been shown to raise serum and hepatic cholesterol whereas some workers have shown that deoxycholic acid has an opposite effect. This may be due to the possibility that different bile acids have different cholagogue intensities and different rates of excretion. Bile acids act as cholagogues and thus increase the rate of their own enterohepatic cycle. If there were no excretory losses of bile acids there would be no need for catabolism of cholesterol, but it is known that reabsorption of bile from the gut is never complete and in addition there is some excretion in the urine. At a faster turnover rate, therefore, one would expect greater losses of bile acids, and greater catabolism of cholesterol from the liver.

It is thus evident that the rate of catabolism of cholesterol into bile acids and neutral sterols will directly affect the rate of synthesis of cholesterol by altering the physiological concentration in the liver. That is to say, the faster the rate of catabolism the

faster will be the rate of anabolism. The level of cholesterol in the liver and serum of an animal will, therefore, depend on dietary factors such as the total amount of fat, quality of fat, the amount of cholesterol and certain bile acids and structurally related sterols.

Lipogenesis and cholesterolaemia. Under physiological conditions cholesterolgenesis takes precedence over lipogenesis in its demands from the acetate pool, so that the rate of cholesterol formation is at its maximum while the rate of lipid formation, other than cholesterol, lags behind. This has been supported by the experiments of Hill *et al.* and Williams *et al.* *in vivo* and *in vitro*.

If there is an abnormality or fault in normal lipogenesis, then it is reasonable to assume that some of the acetate units will be used for the formation of more cholesterol in the liver and serum.

In conclusion, dietary fat—particularly saturated fat—partial or complete biliary obstruction, sluggish or faulty mechanism for clearing blood lipids—be it from stress, smoking or some other reason—all result in higher concentrations of serum and liver cholesterol.

We thank Prof. J. Yudkin, Dr. D. Robinson and Dr. A. E. Bender for constructive criticism.

(The omitted figure and references may be seen in the original article.)

ULTRASONIC DOPPLER INSPECTION OF THE FETAL HEART

CDR Richard L. Bernstine MC USN and CAPT D. A. Callagan MC USN*
Bethesda, Maryland. Reprinted from the *American Journal of Obstetrics and Gynecology* 95: 1001, 1966, The C. V. Mosby Company, St. Louis.

In the middle of the nineteenth century, a professor of physics at the University of Vienna propounded a theory which bears his name. Christian Doppler noted that the apparent frequency of waves depends on the relative motion of the wave source and the observer. He applied the theory to explain the color of the stars as the earth and the stars approach or move away from each other. We used the theory in the study of the fetal heart and its movement. The waves in this case are ultrasound waves provided by vibrations of quartz crystals in the transducer. These waves are transmitted into the maternal abdomen (Fig. 1, not shown) and are reflected at all interfaces perpendicular to the beam.

Unless they strike a moving object (i.e., fetal heart), they are reflected at the same frequency as produced. When they strike a moving object, their frequency is altered and an audible difference (beat) occurs between the transmitted and reflected waves.

If the fetal heart is approaching the sound source (transducer), the apparent frequency would be increased; while, if the fetal heart is moving away, the apparent frequency would be decreased.

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The views expressed are those of the authors and not necessarily those of the Medical Department of the Navy.

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The clinical application of the theory is not difficult. To examine the fetal heart, the transducer is applied to the maternal abdomen with gentle pressure. A small amount of water is used to obtain coupling between the transducer and the skin, and a deliberate search of the uterus in systematic fashion is made to find the fetal heart. If the uterus is large, the Doppler signal is usually heard in one of the lower quadrants at about 45 degrees from the umbilicus. When the uterus is small it is usually advisable to locate fetal motion and keep the transducer at that site. The movement of the fetus in a short time will bring the fetal heart within the ultrasonic beam.

Results

Table I details the results of attempting to locate the fetal heart by this technique in 307 consecutive cases examined during pregnancy (excluding labor). The cases represent patients rather than number of tests performed. When more than one test was performed, the initial test result is reported in this table. The Doppler shift due to fetal heart action is usually observed within the first few minutes of testing. The test is considered negative if 15 minutes elapses without the fetal heart being found.

The corrected failure rate is low (1.7 percent) which includes only live fetuses when any portion of uterus has become abdominal.

We have compared the results of Doppler inspection of the fetal heart with the results of fetal electrocardiography. The accuracy of the fetal electrocardiogram has been summarized from reports in the literature and from personal experience. In the earlier period (12 to 16 weeks) of pregnancy, the Doppler yields a greater percentage of positive tests. Again, in the period of 28 to 32 weeks, the Doppler is superior. Once the high degree of accuracy of the Doppler is reached, it is maintained.

Our experiences with the Doppler technique for diagnosis of multiple pregnancies have been unsatisfactory because the beam is highly directional and only fortuitously could it be directed at two hearts simultaneously.

Comment

Callagan, Rowland, and Goldman and Johnson and associates have indicated the ability to detect fetal life by using an ultrasonic device applied to the maternal abdomen. The later authors reported 25 cases in early pregnancy with complete accuracy of diagnosis after 12 weeks of life.

TABLE I. Results*

Weeks of gestation	Positive	Negative	Uterus in pelvis	Dead fetus
Less than 10	2	5	5	
10-14	16	8	6	
14-18	31	4		3
18-22	36			
22-26	29	1		1
26-30	27			
30-34	40	1		
34-38	43	2		1
38-42	44			

* Total tests, 307 (including 2 nonpregnant patients); false negative, 16 patients (5.3 percent); corrected, 5 patients (1.7 percent); false positive, 0 patients (0 percent).

The present study was conducted to test the efficiency of this technique at various stages of gestation. The earliest pregnancy in which we were able to detect fetal heart action occurred 9 weeks and 5 days after commencement of last menses. In general, the determining factor in the efficient use of the Doppler is related more to the height of the fundus than the duration of pregnancy.

In addition to fetal heart action, the ultrasonic Doppler technique will detect movements from other sources. It is important to be able to differentiate these from fetal heart action. Blood flow in large vessels and the placenta may be detected. Fetal movement is commonly heard especially in early pregnancy. Bowel peristalsis may be heard if the transducer is not accurately placed over the uterus. The latter can be mistaken for fetal movement. The beat due to fetal heart action is rapid, usually high pitched and has been described as "the sound of horses' hoofs when running." Figs. 4 and 5 illustrate the typical signal received from the fetal heart (omitted). There is a group of high amplitude waves followed by a short pause and then lower amplitude waves followed by a longer pause. The cycle then repeats. The high amplitude waves represent the early phase of ventricular contraction; the smaller amplitude waves represent early phase of ventricular relaxation.

Conclusion

The ultrasonic Doppler technique to detect fetal heart action has been evaluated in a clinical trial. It has been found to be superior to existing methods for this purpose.

(The omitted figures and references may be seen in the original article.)

MEDICAL ABSTRACTS

IS EXCISION THE OPTIMUM TREATMENT FOR ALL ABDOMINAL AORTIC ANEURYSMS?

E. F. Bernstein MD, J. C. Fisher MD, R. L. Varco MD, (From the Department of Surgery, University of Minnesota Medical School.) Surgery 61: 83-93, January 1967.

Recent articles indicating that untreated patients with abdominal aortic aneurysms may have a much better prognosis than has been thought stimulated the authors to review the literature relating to the survival of untreated patients with abdominal aortic aneurysms and to compare the published data with a series of patients treated by excision and graft at the University of Minnesota Hospitals, 1948-1960. In their opinion, the long-term accomplishments of modern operative treatment appear less substantial than had been hoped for and suggest the need for a re-evaluation of this type of treatment.

They discuss the age of the patient, associated cardiovascular and renal disease, hypertension, previous myocardial infarction, and aneurysm size as these relate to the prognosis. Individualization of treatment and careful selection of patients for surgery are stressed.

LITTLE PUBLICIZED ASPECTS OF THROMBOEMBOLISM

J. H. Olwin MD and J. L. Koppel PhD, (From the Coagulation Research Laboratory, Division of Surgery, Presbyterian—St. Luke's Hospital, Chicago, Illinois.) Med Clin N Amer 51: 151-159, January 1967 (Vascular Diseases).

Doctors Olwin and Koppel have called attention, in this article, to some very interesting, provocative, and certainly important aspects of thromboembolism including: (1) some of the less well known effects of heparin, (2) the possible influence of stress, (3) clinical conditions characterized by microthrombosis, and (4) the possible relation of plasma lipids, gout, and smoking to the thrombotic tendency.

Under (1), they include the thrombolytic action, the anti-inflammatory action, and the diuretic action of heparin. In discussing the possible influence of stress on thromboembolism they mention the accelerating effect of moderate doses of epinephrine

(adrenalin) on the rate of clotting of blood and suggest that the patient with a thrombotic tendency who is subject to frequent periods of emotional stress may well benefit from sedatives and under extreme conditions from supplemental heparin therapy during such periods.

Among some of the more important factors contributing to disseminated microthrombosis, excessive production of adrenal medullary and cortical hormones, pregnancy, excess of endotoxins, incompatibility of infused blood, extensive tissue injury (crush syndrome, burns, et cetera), certain types of malignancy, pancreatitis, and pseudomembranous enterocolitis are listed. The use of heparin in these situations is suggested because of its effective use in a number of them has been reported.

The clot-accelerating effects of lipids, with emphasis on the phospholipids is discussed at some length. Of particular importance, it appears, is the inhibition of plasma fibrinolytic activity, observed both in-vivo and in-vitro, by lipid ingestion. Recent observations of the stimulation of fat clearance by oral anticoagulants as well as by heparin has led the authors to add anticoagulant therapy to the standard regimen of low fat and/or carbohydrate diet and the interdiction of smoking in the treatment of patients with elevated lipids, particularly total lipids, phospholipids, and triglycerides. Patients with thrombosis and abnormal uric acid levels need treatment for the correction of both. Since it is known that there is an increased release of catecholamines in the blood and excretion in the urine following the smoking of a cigarette, that both smoking and epinephrine increase the level of free fatty acids in the blood and observers have shown a correlation between plasma free fatty acid levels and the formation of thrombi, it is important to urge the thrombosis-prone patient to forego the use of tobacco.

ONE YEAR'S EXPERIENCE IN THE ANESTHETIC MANAGEMENT OF TRAUMA, 1964

H. Carolyn Crighton MD and A. H. Giesecke MD, (From Parkland Memorial Hospital, Dallas, Texas.) Anesth Analg 45: 835-842, November-December 1966.

This analysis, replete with statistics, really needs

Careful reading for appreciation of the amount of information which is included in it about civilian trauma. In addition to anesthetic management, (premedication, technic, choice of agents), of 1161 patients requiring an anesthetic during the surgical management of trauma, preoperative fluid resuscitation, supplemental fluids, replacement fluids and blood, and other ancillary means of supporting injured patients during emergency surgery have been tabulated. Inhalation anesthesia, halothane most frequently, was used in 86% of all cases. Factors which influenced anesthetic management including evaluation of the type of injury, general condition of the patients, type of surgery planned, and the skills of both the anesthesiologist and the surgical team are discussed.

BRONCHOPULMONARY LAVAGE—NEW TECHNIQUES AND OBSERVATIONS

Jose Ramirez-R MD, (From the Medical and Research Services, Veterans Administration Hospital, Baltimore, Maryland.) Dis Chest 50: 581–588, December 1966.

The author describes his technique for pulmonary lavage using apparatus which allows filling of the selected lung with irrigating solution with a filling pressure not exceeding 30 cm of saline and then drainage into a conventional type water-sealed bottle placed 60 cm below the level of the mid-chest. This obviates filling and emptying of one lung with active inhalation and exhalation of the fluid by the patient—while active breathing of 100 percent oxygen is carried on by the other. Repeated irrigation of a whole lung with liters of a saline solution containing acetylcysteine or heparin is permitted.

He has summarized clinical and laboratory observations during 25 lavages in seven patients and has concluded that bronchopulmonary lavage with this technique is effective in the treatment of alveolar proteinosis and he feels that it may be helpful in the treatment of bronchial asthma but it does not appear useful in the treatment of chronic bronchitis.

PULMONARY EDEMA IN THE COURSE OF A BLOOD TRANSFUSION WITHOUT OVERLOADING THE CIRCULATION

E. Philipps MD and F. G. Fleischner MD, (From the Department of Radiology, Peter Bent Brigham Hospital and Harvard Medical School.) Dis Chest 50: 619–623, December 1966.

Three cases of transient pulmonary edema ob-

served in the course of transfusion reactions are presented in this report. Hypervolemia was not considered the causative factor because of the small amount of transfused blood (500 cc, 400 cc, 200 cc) and lack of clinical evidence of left ventricular failure. The reactions are attributed to incompatibility of undetermined nature. The edema as seen radiologically was presumably mainly interstitial; accompanying symptoms and signs were cough, fever, and cyanosis. Clearing of the edema occurred in one to five days. All patients were nonsurgical and the authors think that the study of this fleeting pulmonary edema may shed some light upon the postperfusion lung syndrome.

THE BOUNDARIES BETWEEN PHYSIOLOGY, PATHOLOGY, AND IRREVERSIBILITY AFTER INJURY

S. Sevitt MD, (Based on the 1966 presidential address to West Mercian Branch of the Association of Clinical Pathologists on November 12, 1966.) Lancet II: 1203–1210, December 3, 1966.

This is a thought provoking discussion of the significance of various systemic responses to injury in relationship to the physiological, pathological, or irreversible nature and the boundaries between these. Many effects of injury are obviously harmful (hemorrhage, renal failure, or cerebral fat-embolism) or are potentially so; and many, such as pulmonary fat-embolism, the constriction of skin and muscle vessels to reduce bleeding which helps to combat loss of blood volume, can be considered as defense mechanisms.

The author divides the borderlands between physiological, reversible/pathological, and irreversible changes after injury into four broad but overlapping groups: (1) Harmless or beneficial changes which may become pathological, (2) Reversible pathological sequelae which may become irreversible, (3) Responses of uncertain significance or importance, (4) Misinterpreted effects. Then, in detail, he discusses traumatic lipaemia and fat-emboli; pulmonary fat-embolism; systemic and pulmonary fat-embolism; vasoconstriction in shock; nervous activity and depression after injury; extrarenal azotemia and acute renal failure; adrenocortical changes and hyperactivity; acute hyperglycemia; hemoglobin and iron metabolism; hypercoagulability, fibrinolysis, and microthrombosis; and sodium retention and hyponatremia. Some of these, hyponatremia and so-

dium retention by the kidney and post-traumatic morphological changes in the adrenal glands have been misinterpreted in the past leading, in some instances, to wrong treatment. Some like transient hypercoagulability and activated fibrinolysis may represent defensive mechanisms but the significance of others such as excessive secretion of hydrocortisone by the adrenal gland, acute hyperglycemia, and changes in iron and hemoglobin metabolism are debatable. Primitive defense mechanisms may still persist but now serve no useful purpose; hyperglycemia may be an example.

The possible breakdown of certain defense mechanisms is discussed including that related to hypercoagulability, fibrinolysis, and microthrombosis. Fat-embolism, he thinks, provides examples of misinterpreted and debatable effects and the production of a pathological event (cerebral embolism) from a change in the quantity of lung emboli.

ELECTRIC SHOCK HAZARDS IN CLINICAL CARDIOLOGY

R. E. Whalen MD and C. F. Starmer MSEE, (From the Cardiovascular Laboratory, Department of Medicine, Duke University Medical Center, Durham, North Carolina.) Mod Conc Cardiov Dis 36: 7-12, February 1967.

The authors have written a timely review of potentially dangerous situations in clinical cardiology listing those in cardiac pacing, cardiac catheterization and angiography, pericardiocentesis, and cardioversion. Under Safety Precautions and Equipment Testing, they recommend:

1. A defibrillator and resuscitative equipment should be available immediately when any new equipment is attached to the patient who has a low resistance conductor in his heart.

2. Routine testing of electrical equipment (even that with the seal of approval of the Underwriters Laboratory) as follows:

1. All routine hospital equipment, usually considered harmless (e.g. suction machines, electrically controlled hospital beds, and portable x-ray machines) for possible leakage current;

2. Tailor-made or equipment modified in local electronic shops.

They advise that ventricular fibrillation in a patient who has a low-resistance conductor in his heart be considered electrically induced until all testing efforts designed to disclose the genesis of the fibrillation have been exhausted.

They go on to say, "Since the vast majority of shock hazards in cardiology stem from leakage voltages and currents which develop on equipment, we have found the following testing procedure extremely helpful. The magnitude of current leak in any power-line operated machine is determined by measuring the voltage change across a 1,000-ohm resistor placed between the machine being tested and the power-line ground system (usually the third or ground slot in a three-prong wall outlet). A resistance of 1,000-ohms was chosen because it approximates the resistance of the heart. The voltage must be determined with a vacuum-tube voltmeter to ensure accuracy. Once the voltage is known, two of the three factors operative in Ohm's Law (voltage and resistance) are known; thus, the possible current leak available from a particular machine can be calculated (current = voltage/resistance).

It is imperative to use a reliable resistor while measuring such voltage. Simple measurement of voltage between a machine and ground may give a falsely high impression of the current available in a clinical situation. Interposition of a 1,000-ohm resistor between the machine and ground provides a complete circuit from the machine to the ground. This circuit contains two resistors in the system, the 1,000-ohm resistor placed for testing *plus* the internal resistance of the machine itself. This internal resistance can be very high and can serve as an effective impediment to current flow despite relatively large leakage voltages on the machine in question. For instance, an ungrounded ECG machine when tested without a resistor in the circuit, may register a 120-volt potential between the machine and ground; when a 1,000-ohm resistor is interposed between the machine and ground only a 2-volt potential may be noted. The discrepancy is due to the internal resistance of the ECG machine, which only becomes evident when current is allowed to flow through the 1,000-ohm resistor."

DENTAL SECTION

CANCER OF THE LIP IN A LARGE CHARITY HOSPITAL

C. G. Longenecker and R. F. Ryan, Southern Med J 58(11): 1459-1460, November 1965.

Among 981,462 admissions to the Charity Hospital of Louisiana at New Orleans from 1948 through 1962, 26,072 patients had cancer, and 425 of these (1.6%) had squamous cell carcinoma of the lip treated at this hospital. About one-half of the patients were in the sixth and seventh decades of life. Average age was 59.6 years. Fifteen percent of the patients were less than 45 years old. The disease was most frequent in white men (88%) and least common in Negro women (less than 1%). The lower lip was affected in 90% of the patients. Less than 1% of the lesions occurred at the lip commissures. Thirty-three percent of the patients had cancer at other sites as well. Cancer of the skin of the face accounted for 61% of the extralabial lesions, and cancer of the lung 7%. Seventy-two of the 425 patients were excluded from the analyses of treatment results because 5 years had not elapsed since treatment. Rates of survival 5 years after operation (73%) were about the same as after irradiation (72%). Local lesions recurred after treatment in 5% of the 353 patients. Metastasis to cervical lymph nodes occurred in 8% of the 353 patients. The 5-year cure rate after therapeutic neck dissection in patients with metastatic lesions was 48%.

(Abstracted by: CDR William R. Cotton DC USN.)

CANCER OF THE TONGUE: A REVIEW OF 64 CASES

E. Robinson, A. Hochman, J. Michman, and I. Horowitz, Radiol Clin Biol 34: 337-346, 1965.

During the years 1933-1957, 64 patients with cancer of the tongue were seen by the Department of Oncology, Hadassah University Hospital. Thirty-eight were male and 26 were female. The average age was 53.1 years. The tumor was present in the body of the tongue in 65.6% of the patients and at the base in 34.4%. In the former location, 51.6%

of the cancers were between 2 and 4 cm in diameter. At the tongue base 69.2% of the tumors were larger than 4 cm. Of the 50 tumors which were biopsied, 29 were squamous cell carcinomas, 19 were non-specific carcinomas and 2 were anaplastic carcinomas. Sixty-four percent of all the cases were metastatic to the lymph nodes. From the body of the tongue 54.7% of the tumors were metastatic and from the base of the tongue 72.7% were metastatic. Lymph node metastases were unilateral in 74% of the patients. The larger the primary tumor the greater the incidence of lymph node metastases and the lower the cure rate. The preferred treatment for cancer of the tongue body was radium needle implantations. For tumors of the tongue base patients were treated with radium needles and/or local x-ray therapy. Operable lymph node metastases were referred for block dissection. The 5-year cure rate was significantly higher in women (35.5%) than in men (22.7%; $p < 0.05$). The cure rate was greater in the group below 50 years of age (40%) than in the older group (20.8%). Tumors in the tongue body had a 5-year cure rate of 25.5%, whereas those in the tongue base had only a 10% cure rate. The total average 5-year cure rate was 28.2%.

(Abstracted by: CDR William R. Cotton DC USN.)

PERSONNEL AND PROFESSIONAL NOTES

REQUISITIONING OF NEWLY STANDARDIZED ITEMS OF INTEREST TO DENTAL OFFICERS

Cognizant dental officers are reminded not to submit requisitions for newly adopted items until their availability is announced in the JOINT FMSO-FLDBRBUMEDINSTR 6700.1A series of change transmittals. This instruction is distributed to all ships and stations having medical and dental personnel, and routing instructions are contained in the basic body of the instruction. The dental officer should insure that each change transmittal is routed to the dental department.

The JOINT FMSO-FLDBRBUMEDINSTR 6700.1A series provides valuable information, such

as availability of newly standardized items, extended potency dates of antibiotics, announcement of defective medical and dental material, price revisions, etc., and should be carefully read by cognizant personnel.

Activities that are missing JOINT FMSO-

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Commanding Officer

U.S. Navy Fleet Material Support Office (Code 923)

Mechanicsburg, Pennsylvania 17055

NURSE CORPS SECTION

INTENSIVE CORONARY CARE WORKSHOP

LCDR Ruth G. Pampush NC USN, Educational Coordinator, Nursing Service, Oak Knoll Naval Hospital.

An intensive coronary care workshop for nursing service has been established at this hospital under the supervision of CAPT Henry A. Sparks, Chief of Medicine for the purpose of instructing staff in the performance of duties in the intensive coronary care unit which is now functioning at Oak Knoll.

The purposes of the coronary care unit are to improve the medical and nursing care of the patients with recent or suspected myocardial infarction and to decrease the number of resultant deaths, to bring medical and nursing practice to a level where it utilizes the knowledge gained from research, and to help fulfill our obligation to the American people who have donated millions of dollars to hear research and who have been taxed for millions more.

The concept of the coronary care unit is therefore a natural product of current needs and current capabilities. The unit is a separate area within the hospital specifically equipped and staffed to meet the total anticipated needs of the patient with myocardial infarction. Constant, intensive surveillance is provided, and emergency treatment can be instituted without delay. Although the facility is equipped to monitor electrocardiograms and other vital signs as indicated, no degree of electronic excellence can replace the nurse and physician.¹

Because she is the one who is with the patient for twenty-four hours a day, the nurse specialist is the most vital element in the whole concept of intensive coronary care. She offers excellence in intensive nursing procedures through her familiarity with the particular physical and emotional needs of the coro-

nary patient and through her training in the recognition and emergency management of complications.²

The present workshop together with a continuous teaching program for constant retraining of intensive coronary care personnel has been developed to produce the nurse specialists who will work in the unit.

Objectives of the workshop are: to gain knowledge and understanding of cardiac function, cardiac disease, diagnostic measures used in detecting cardiac disease, cardiac drugs, electronic machines, comprehensive nursing of cardiac disease patients, the nurses' role as teacher; and the development of special skills used in the intensive coronary care unit. The special skills include observation skills, ECG interpretation—identification of patient problems as evidenced in the ECG tracing, proper use of technical nursing skills, proper use of communication skills, proper use of medical-scientific vocabulary, and patient teaching.

Course content includes the following: purposes, aims & objectives, statistics, anatomy of cardiac circulation, pathology of myocardial infarction, enzymes involved in myocardial infarction and its detection, clinical picture of the patient with a myocardial infarction, coronary precautions, monitor units—use, function, hazards, ECG apparatus and function, practice using ECG, monitors, principles of ECG pattern recognition, normal readings, arrhythmias, cardiac drugs, cardiac resuscitation, demonstration and practice of defibrillation in the dog lab, airways, respirators, tracheal toilet, metabolic factors in cardiac arrest, pacemakers, shock, and the unit drill of precise roles in cardiac arrest.

The workshop was developed by CDR W. S. Myers MC USN, Assistant Chief of Medicine and Cardiologist, LT Gerald A. Wolff MC USN, Cardiologist, and LCDR Ruth G. Pampush NC USN, Nursing Educational Coordinator at Oak Knoll, under the direction of LT Wolff who had worked

1. "Training Technics for the Coronary Care Unit," Second Bethesda Conference of American College of Cardiology, Dec 11, 12, 1965, Washington, D.C., Amer J Cardiol, May 1966, p 739.

2. Ibid.

with Dr. Bernard Lown in establishing the Samuel A. Levine Cardiac Center at Peter Bent Brigham Hospital in Boston. Many instructors from other services contributed their time and the cardiologists, in particular, spent many hours assisting with ECG pattern recognition drill.

The enthusiasm of the students and commitment of the instructors resulted in a highly successful and rewarding workshop. It will be repeated 14-19 November to augment the present ICCU staff.

NAVY NURSES ATTEND NEURO-PSYCHIATRIC COURSE

A short course sponsored by the Bureau of Medicine and Surgery, "Neuropsychiatric Nursing" was presented by the staff of the U.S. Naval Medical

School, National Naval Medical Center, Bethesda, Maryland from 16-20 January 1967. The course contained information for Nurse Corps officers which would better assist them with the nursing care of the neuropsychiatric patient.

The areas of communications, therapy, psychiatric concepts, rehabilitation and research when caring for the neuropsychiatric patient, were stressed. Twenty Nurse Corps officers attended the course which was presented and directed by CDR Mary F. Cannon NC USNR, LCDR Katherine Wilson NC USN and LCDR Angeline G. Liakos NC USN.

The desire to continually improve the nursing care of the neuropsychiatric patient prompted the presentation of the short course.—Public Affairs Office, BuMed.

OCCUPATIONAL MEDICINE SECTION

CUTTING AND GRINDING FLUIDS AND THEIR EFFECTS ON THE SKIN

Marcus M. Key MD, Edmond J. Ritter, and Kenneth A. Arndt MD, Cincinnati, Ohio. Amer Industr Hyg Ass J 27(5): 423-427, Sept - Oct 1966.

Scope of the Problem and Future Trends

During the heightened industrial activity of World War II, cutting oils were blamed for much of the industrial skin disease in the United States, and acquired a bad reputation. Actually, they caused only 3.1% of the cases of industrial skin diseases reported by seven states to the U.S. Public Health Service between 1938 and 1943.

A prospective study in 1956 by the Industrial Hygiene Foundation showed that 27% of cases of industrial dermatitis seen in dispensaries of a variety of manufacturing industries were due to cutting oils. However, a distinction should be made between skin diseases seen in a plant dispensary and those that cause lost time and are compensated.

Soluble oils and synthetics now comprise about two-thirds of the market, but there has been renewed interest in insoluble oils since the development of transparent and multipurpose oils. In 1961, over 14 million gallons of insoluble and soluble oils were used in the U.S. About two-thirds of the oil was used by the metal working industry; chemical processing, textile manufacturing, and other industries accounted for the remainder. The number of machine tool operators, machinists, layout men, in-

strument makers, tool and die makers, and setup men in the U.S. in 1965 was estimated at slightly over one million.

The effect of automation on employment in the machine tool and metal working industries in the next few years is expected to be offset by industrial expansion, so that the total number of machinists and workers in allied trades is not expected to decrease. Automation may influence formulation of cutting fluids by permitting a more irritating cutting fluid with better lubricating or cooling qualities to be used. Changes in metal cutting and forming, such as chipless machining, machining of very tough metals which are temporarily softened by induction heating, and ultra-high speed machining, will undoubtedly require different formulations.

Action on Metal

In metal cutting, a hardened tool edge removes chips by different mechanical means such as planing, turning, drilling, broaching, and milling. The chip is formed by plastic deformation of the metal immediately ahead of the tool edge. A large amount of heat is generated in this shearing process, and metal and tool may weld together if it is not dissipated. The friction of the chip sliding past the tool

and of the tool sliding over the cut surface also contributes to the heat load. Grinding may be thought of as a special form of cutting in which the metal is removed by a grinding wheel, containing countless abrasive grains which act as miniature cutters.

Thus, cutting fluids have two primary functions: (1) to cool, which prevents distortion of the work-piece and prolongs tool life, and (2) to lubricate, which minimizes frictional heat formation. Secondary functions are to prevent rust and to flush away metal chips and swarf.

Action on Skin

Oil Acne and Folliculitis. These are the most common cutaneous problems of those who work with insoluble oils. Involvement of as many as 80% of those exposed has been reported, but fortunately this condition is seldom disabling. Poor personal hygiene (infrequent skin cleansing and prolonged wearing of soiled clothing) causes follicular openings in hairy contact areas to become blocked by oil, producing comedones (blackheads) and papular lesions (pimples) with varying degrees of inflammation. Follicular occlusion is believed to be primarily mechanical, similar to blockage by grease, carbon black, and various dusts. Common sites are the backs of the hands, the extensor surfaces of the forearms and thighs, temples, and back of the neck. Inflammation around the blocked follicles may be due to irritation by the oil, rupture into the tissues of retained sebum, or secondary infection by skin bacteria (staphylococci). The secondary bacterial folliculitis occasionally progresses to furunculosis (oil boils).

Chloracne. In the past, chloracnogens were chlorinated naphthalenes and chlorinated diphenyl oxides, which were used as extreme pressure additives. In addition to acne-like lesions on exposed skin, liver damage also occurred. Chloracne from cutting oils has not been observed in recent years.

Keratosis and Squamous Cell Skin Cancer. These are quite rare in the United States but have occurred in Europe from contact with shale oil.

Melanosis. Peri-follicular hyperpigmentation may result from direct irritation of oil, or may be secondary to folliculitis. Sunlight may also play a role. This rare condition is seen most often in those of Mediterranean origin.

Mechanical Injuries from Chips and Swarf. These injuries are uncommon, except when wipe rags or waste contain sharp particles or when machined parts have sharp edges. They are sometimes complicated by secondary infection.

Irritant Contact Dermatitis. The chief problem which results from exposure to soluble cutting oils and synthetic coolants is eczematous contact dermatitis, which is manifested in the acute stage by redness, swelling, and water blisters, and in the subacute and chronic stages by varying degrees of redness, scaling, cracking, and thickening of the skin. The subacute and chronic types are usually attributed to repeated exposures to emulsions with soap-like action and/or to alkaline aqueous solutions, both of which can act as low-grade irritants. With some of the milder products it would probably be more accurate to presuppose previous damage to the skin, such as that caused by low humidity in winter, harsh cleansers, or solvents. Often the dermatitis will subside with the onset of warm weather, without changing any of the other conditions.

The appearance of the dermatitis and response to preventive measures are similar to those of eczema of housewives and of others whose hands are in water much of the time. The common mechanism may be damage to the cutaneous barrier layer (stratum corneum), and repeated cycles of wetting and evaporative drying are probably more harmful than prolonged immersion. The roles of soap and pH per se in housewives eczema are still controversial.

Less common causes of irritant contact dermatitis are excess bactericides, some extreme pressure additives, rancid fatty oils, low boiling distillates similar to light machine oil and kerosene, acroleins from overheated oil, amines, and chlorinated solvents.

Allergic Contact Dermatitis. This is difficult to distinguish clinically from irritant contact dermatitis, but is rare by comparison. Sensitizers have included bactericides and breakdown products, corrosion inhibitors, nickel salts from machined metal, and chromates. Allergic reactions to mineral oil have been reported, but are very rare.

Bacterial and Other Contaminants

The belief that bacteria present in cutting fluids is an important cause of skin disease has no basis in fact. Certain areas of skin are periodically contaminated by coagulase positive (pathogenic) staphylococci, and although they may survive for long periods in about 20% of the adult population, they do not usually multiply or cause infection on undamaged normal skin. When the skin is damaged or when drainage systems such as follicular canals are blocked, however, these areas of lowered resistance are rapidly colonized by pathogenic staphylococci. The most common sources of the staphylococci that

contaminate the skin are the nostrils of persistent (20% of the community) and transient (50–60%) carriers.

Insoluble cutting oils are relatively free of bacteria. Fresh insoluble oil is sterile, but the presence of water will allow survival and limited growth of certain bacteria, usually gram-negative. During use, oil may become mixed with condensation water, as well as with emulsion-type cutting fluids and synthetic coolants. The U.S. Public Health Service has analyzed samples of insoluble cutting oils used by workers who had oil folliculitis and found no significant number of pyogenic organisms.

Emulsifiable oil and synthetic coolants are sterile when manufactured. After being mixed with water and used, a variety of bacterial and mycotic organisms can be isolated—some coming from human contamination, and some from water and air. The predominating bacteria are Pseudomonads, frequently in association with *Achromobacter* and *Vibrio* species, *Bacillus subtilis*, and *Proteus vulgaris*. Coliform bacteria and enterococci, indicative of fecal pollution, are occasionally found, and rarely pathogenic *Staphylococcus*, *Salmonella*, and *Shigella* species. Thus, soluble oil emulsions, which frequently contain bacteria, are not associated with bacterial infections of the skin. Ironically, the insoluble oils, which are relatively free of bacteria, are the cutting fluids associated with folliculitis.

The presence of certain bacterial species in emulsion-type lubricating coolants has been associated with deterioration of the emulsion, with rusting, and with odor production. Bactericides are added primarily to prevent these changes and not for prevention of infections. Emulsions can deteriorate for other reasons, e.g., hard water, and an excess of bactericide may be needlessly added. Bacteriologic examination of a cutting fluid may be of value in ascertaining the cause for lubricating coolant breakdown, but it is unlikely to be helpful in finding the cause of an outbreak of skin disease.

It is not surprising that a variety of contaminants may get into lubricating coolants and sumps; these include spit, urine, feces, garbage, floor sweepings, floor cleaning detergents, cigarette butts, dead rats,

live frogs, lubricating and hydraulic oils and their additives, and nickel salts from machined nickel. Of these only nickel salts and floor cleaning detergents have been implicated as causes of dermatitis. The cleanliness of the lubricating coolant system is a good index of environmental hygiene.

Prevention and Management

There are several categories of preventive measures. Environmental methods, such as splash guards on automatic screw machines and good housekeeping, are designed to prevent or reduce contamination of the machinist or his clothes. Protective clothing, such as aprons and sleeves, and protective ointments of both oil and water-repellent types are used when contact cannot be avoided. The last line of defense is to effectively remove the offending agent from the skin. Personal cleanliness is always feasible, even in the smallest shop. Waterless hand cleaner stations can be set up near the machines, if handwashing facilities are remote. Waterless hand cleaners are especially useful for removal of oil, but as with soap, care must be taken to avoid harsh cleansers. The use of raw solvent for cleaning the skin should be forbidden.

In managing an outbreak of skin disease in a cutting or grinding operation, the first step should be establishing the cause of the outbreak. With irritants, this is done by matching a compatible clinical appearance with the reputation of the suspected agent. Since it is difficult to distinguish irritation from allergy by clinical appearance, patch testing is usually necessary.

In oil folliculitis the worker should wash more often, preferably with a bacteriostatic soap. In primary irritant contact dermatitis from water-base lubricating coolants, the worker should wash only when necessary and use a mild white soap or soap substitute and lukewarm water. With exposures to defatting or drying agents, it is advisable to provide an emollient cream for application after hand washing. Regardless of the cause of an outbreak of dermatitis from lubricating coolants, contact should be minimized and personal hygiene should be improved.

ACUTE BENZENE POISONING

*LT J. Drozd MSC USN and E. J. Bockowski HN USNR, Ann Arbor, Mich.
JOM 9(1): 9-11, January 1967.*

In the renovation of a confined room, floor tile was taken up and the old adhesive was removed with the aid of benzene. New tile was then laid, and benzene was used to remove excess adhesive. The space was 8 ft. high, 7 ft. wide, and 12 ft. long, and had one door (26 x 57 in.) positioned approximately 1 ft. above ground level. There was no ventilating system within the space. The room was steam-heated by one permanent radiator; in addition, a portable, open-coil space heater was used.

The renovation was done by 4 men designated Employees 1, 2, 3, 4. Employee 1 worked for a longer time in this space compared with the duration of exposure for Employees 2, 3, and 4, and was eventually overcome by benzene vapor.

Case Report

The work consumed 2 days, designated Days 1 and 2. On Day 1 work commenced at 9 a.m. with the men taking up tile and using benzene as a solvent to remove the remaining adhesive. Rags were used to wipe up the dissolved adhesive; these were then thrown into an open container that remained in the space until late in the afternoon. At about 11 a.m. work ceased, was resumed again at 1 p.m., and was continued until 3 p.m. During the morning hours the door to the space was closed, and in the afternoon it was left open. When the benzene vapor became annoying the men vacated the space and remained outside for a few minutes before returning to work.

On Day 2 the work commenced at 9 a.m. The men worked principally with a water-base adhesive to lay the new tile. At 11 a.m. work ceased, was resumed again at 1 p.m., and was continued until 4 p.m. The door to the space was open all day. A small amount of benzene was used to clean hands and remove adhesive.

Employee 1 returned at 6 p.m. and worked until 9:30 p.m. at which time he felt sick. Complaining of malaise, nausea, and dizziness, he was treated for his symptoms and instructed to spend the night in a well-ventilated room. The following morning his symptoms persisted, and the patient was hospitalized. Physical examination revealed a slightly ill-appearing 19-year-old white male. His temperature was 100.4° F, his pulse rate 88, and his blood pres-

sure 90/40. The remainder of the physical examination was negative except for paravertebral tenderness. Laboratory data on admission were as follows: (1) WBC 12,950 (differential-neutrophils 72%, lymphocytes 27%, eosinophils 1%); (2) hematocrit 44%; (3) urinalysis: specific gravity 1.018, albumin negative, sugar negative, sediment 0-1 WBC, 2-4 RBC. Findings from a chest x-ray film and values from a subsequent intravenous pyelogram were within normal limits. Subsequent blood counts and urinalyses were also normal.

A diagnosis of acute benzene intoxication was suspected, and the patient's urine-sulfate ratio was determined as presented below. The patient was discharged after 13 days hospitalization, with no residue.

Investigations

The authors were notified prior to the patient's admission to the hospital, and their assistance was requested in determining the composition of the adhesive. It was established that the adhesive used in laying the tile was a water-base latex providing no toxic vapor. Upon interviewing Employee 1, it was established that benzene also was being used and that its vapor was the likely cause of the illness.

The benzene used was essentially a pure product with a boiling point of 80° C. and a specific gravity of 0.880. Urine samples were obtained from Employees 1, 2, 3, and 4 approximately 12 hrs. after the last exposure to benzene to determine the urine-sulfate ratio. The method used to determine the urine-sulfate ratio was that described Elkins.¹ The value of the ratios obtained does not truly depict the patients' exposure since the urine samples should be obtained within 2 hrs. of final exposure to benzene for complete accuracy. Nevertheless, the test was performed and only Employee 1 exhibited an abnormal ratio. The ratios and their interpretation are presented in Table 1. A ratio of 70.6% indicated a mild-to-dangerous exposure in the case of Employee 1. Employees 2, 3, and 4 were not exposed to a detectable extent on the basis of their urine-sulfate ratios.

The urine-sulfate ratio can be used as a measure

1. Elkins, H.B. *The Chemistry of Industrial Toxicology* (ed. 2). Wiley, New York, 1959, pp. 410-411.

of the degree of aromatic hydrocarbon or benzene poisoning. The mechanism of the response is believed to be due to oxidation of the benzene to phenol or phenolic derivatives which are conjugated in the liver with sulfate ions to form ethereal sulfates, thereby causing a shift to the right in the system: inorganic sulfates = conjugated sulfates. The shift or decrease in inorganic sulfates is related quantitatively to the severity of the benzene exposure to the point of complete elimination of the inorganic sulfates.

Upon completion of the urine-sulfate ratios, an attempt was made to simulate the conditions during which the benzene was in use. For this purpose two large containers were filled with rags soaked with benzene and placed in the working space where the temperature was 72° F. After ½ hr. measurements were made of the benzene vapor concentration, without ventilation, using Draeger gas detection tubes. A summary of the results is given in Table 2.

TABLE 1. Urine-Sulfate Ratios 12 Hr. After Exposure

Employee No.	Urine-Sulfate Ratios (%)
1	70.6
2	89.0
3	97.0
4	95.0

TABLE 2. Benzene Concentrations Under Simulated Conditions

Time (P.M.)	Benzene concentration (ppm)	Condition
2:30	0	Start
3:00	750	Door closed
3:08	1200	Door closed
3:15	1200	Door closed
3:20	1500	Door closed
3:30	600	Door open

Symptoms and Toxicity

The hospital laboratory reports indicated microscopic hematuria, which may be a sign in benzene poisoning. Prolonged inhalation of benzene vapor can induce petechial hemorrhage in the mucous membranes, gastrointestinal tract, and other areas of the body. The etiology of these hemorrhages has not been determined. There is some evidence to suggest alteration in platelet function as well as possible direct effect on the vascular endothelium. In chronic

cases bone marrow depression may result in pancytopenia, although in the early stages a compensatory hyperplasia of the marrow may cause a rise in the number of both red and white blood cells.

Employee 1 complained of vertigo, nausea, headache, and paravertebral tenderness during his illness. Mild symptoms of acute benzene poisoning are irritation of the conjunctiva and the respiratory tract, exhilaration, headache, nausea, and vomiting. With more severe exposure unconsciousness and convulsions may result. In severe acute poisonings, cardiac arrhythmias due to epinephrine sensitization as well as to direct effects on the myocardium have been reported.

Summary and Conclusions

The circumstances of exposure in a case of an acute benzene poisoning are presented, including evaluation of benzene concentrations at the location where the exposure occurred, urine-sulfate ratios of the patient and other exposed workers, and the symptoms and laboratory findings of the patient. The low-threshold limit value of 25 ppm for benzene indicates that adequate ventilation should be a primary concern for users of this solvent—preferably a less toxic solvent be substituted. Personnel having occasion to work with benzene should be informed of the toxicity and flammability of the vapor. Detailed instructions for safe handling and use of benzene are given in the Chemical Safety Data Sheet SD-2, the American Petroleum Institute's review on benzene, and the Shell Chemical Company's Industrial Hygiene Bulletin.

ASBESTOS RELATED DISEASE

Harriet L. Hardy MD, Boston, Mass. Amer J Med Sci 49/381-57/389, October 1965.

Asbestos has a distinguished ancient history. The Romans wove it into cremation robes for ceremonial burials, and Plutarch refers to the wicks in the lamps of the vestal virgins as asbesta, the inconsumable. Legend tells that Charlemagne had a tablecloth of asbestos, kept clean by passage through fire. Not much used until the late nineteenth century, the demand for asbestos has increased steadily because of its insulating properties. Since 15,000 people in North America work in the production and manufacture of asbestos, and many more are exposed to fibers and dusts in industries using asbestos, its toxic potential is important.

The three varieties of commercially used asbestos have differing composition and properties. Chrysotile has long, strong fibers that can be spun, while amosite and crocidolite have fibers useful because they are resistant to heat and acids.

The hazard of asbestos was unrecognized until 1907 when Murray first realized that the fatal pulmonary fibrosis of a patient of his was related to work with this material. During the 1930's the industrial disease, asbestosis, became recognized. Merewether of London reported by 1947 that 15% of men dying with asbestosis were shown to have bronchogenic carcinoma. Wagner, Sleggs and Marchand in 1960 reported from South Africa an association between asbestos exposure and occurrence of cases of malignant mesothelioma among workers and neighbors. Clinical experience in Boston is used here to report to the Association that all three of these harmful effects of asbestos are seen in the United States.

Two recent British observations make the relation between asbestos exposure and malignancy well documented. Twenty-nine percent in one group of cases of asbestosis and 41% in another, all of these women, proved at necropsy to have lung carcinomas. British data (1964) show that 50% of males with asbestosis die of pulmonary malignancy. There are no epidemiologic data on asbestos effect from Canada, the greatest producer of asbestos, nor the United States, a leading user, and in fact there are published denials of this association. As recently as 1953, Isselbacher, Klaus and Hardy reviewed the literature and published a case of asbestosis and pulmonary lung neoplasm, at which time only 9 cases reported by 4 United States authors were found.

There are to date over 100 recorded cases of malignant mesothelioma occurring in workers and neighbors in South Africa. Selikoff, Churg and Hammond have recently shown a significant increase of malignant pleural mesothelioma in United States insulation workers exposed to dust containing asbestos. Reports are at hand of similar malignancy in dockyard workers, asbestos textile workers, miners and processors of asbestos. Through the courtesy of Drs. Castleman and Foley of the Massachusetts General Hospital, records of 23 cases with a diagnosis of mesothelioma made in the past 15 years were reviewed. In 11 of these there were reasonably complete work histories. Of this 11, four had well described job exposure to asbestos, and in 2 cases the work could have included significant exposure.

These observations plus the case of R. P. reported here suggest that United States experience is similar to that abroad.

Wagner's discovery of asbestos-related pleural mesothelioma in individuals living near South African mines or exposed to mine waste (as is this woman) show this to be a neighborhood hazard. Newhouse reports similar findings in London among individuals living near an asbestos textile factory or in the homes of workers from this factory.

A further finding in the current increase in knowledge of asbestos-related disease is a reported significant association between occurrence of abdominal tumors and work with asbestos, reports from both the United States and England.

By search in several countries and his own South African experience, Wagner has, since his first report in 1960, established asbestos as causing malignant mesothelioma in humans. He has also produced the disease in experimental animals. In addition, he and Harington report, in animals and humans, finding hyaluronic acid in the effusion which accompanies these tumors.

Iron, chromium and nickel, found in varying amounts in different kinds of asbestos, are known carcinogens. Oils, associated with asbestos, Harington has shown contain aromatic hydrocarbons, among them 3, 4 benzopyrene. Thus, the malignant effect of asbestos may arise from metal complexes acting with other chemical carcinogens.

Two nonoccupational observations merit your attention. Kiviluoto, by chance, found that residents in Eastern Finland where asbestos is mined exhibit at Roentgen-ray examination pleural calcifications of great size, seen at necropsy to be very dense. These same residents have six times as much lung cancer in males as do residents in other parts of Finland and Norway. Recently, Thomson of Capetown has drawn attention to the presence of asbestos bodies in lungs of city dwellers. (In 500 necropsies in Miami and 500 in Capetown, 20% of females and 30% of males showed asbestos bodies.) Since asbestos is never destroyed, Thomson suggests that its use in brake linings may represent a new urban hazard.

Uncontrolled dust caused textile worker deaths due to asbestos inhalation leading to pulmonary insufficiency and cor pulmonale or tuberculosis. As total exposure to asbestos was lowered, bronchogenic carcinoma appeared as a complication of less severe asbestosis. More recently, with greatly increased use of asbestos, risk of pleural mesothelioma (and perhaps intra-abdominal tumor) in workers

and neighbors appears at exposures lower than those productive of fibrosis.

CARBON MONOXIDE POISONING

Submarine Safetynote, Published by Submarine Safety Center, USN Submarine Base, Groton, Conn.

Brief: A launcher technician on an SSBN experienced CO poisoning while cleaning a missile tube eject chamber.

What Happened:

1. An SSBN equipped with Mk 21 Missile Launch System was returning to port after firing two sabots. Following the launch the tubes had been filled with sea water and blown down three times. The eject chambers were then opened to commence cleaning preparations. The technician entered the first chamber for a few minutes and then moved over to the second eject chamber. After a few minutes in the second chamber he felt dizzy and headachy and got out. He advised his partner of his condition and asked for help to get to sick bay where he suffered momentary unconsciousness. The hospital corpsman observing the technician to be generally cyanotic (blue-gray coloring of hands and face) with cherry red lips diagnosed his condition as carbon monoxide poisoning. Subsequent samples of

the eject chambers disclosed carbon monoxide levels of about 1,000 parts per million.

Comments/Lessons Learned/Food for Thought:

1. Carbon monoxide is classed as a chemical asphyxiant. Carbon monoxide molecules combine with blood hemoglobin two hundred times more readily than oxygen, thereby preventing the blood from carrying oxygen to the tissues. Chemically carbon monoxide is very stable and will remain unchanged in a closed space indefinitely until ventilated out.

2. The Standard Submarine Organization and Regulations Manual contains specific instructions for personnel entering closed tanks and voids. Missile tube eject chambers come under this classification.

3. The Mk 21 launcher system uses a rocket propellant grain to supply the heat and gas for the ejector. One of the major by-products of this propellant is carbon monoxide. Even when the tube has been flushed out with water some of the combustion gases will be trapped in the dead end formed by the cooling chamber and gas generator and will flow out when the tube is depressurized following blowdown of the flushing water.

4. If it is necessary to enter a tube before it can be ventilated with the muzzle hatch open, the tube should be sampled, and even then, the use of EAB equipment is recommended. The tube should not be ventilated inboard while the ship is submerged.

EDITOR'S SECTION

ANNUAL MEETING AMERICAN COLLEGE OF PHYSICIANS

The American College of Physicians will hold its Forty-eighth Annual Session at the Fairmont Hotel, San Francisco, California, 10-14 April 1967. The Bureau of Medicine and Surgery is tentatively arranging an airlift from Andrews AFB, Washington, D.C. to NAS Alameda to accommodate a limited number of medical officers desiring to attend. The aircraft will depart Andrews AFB at 1200, 9 April 1967 bound for NAS Alameda. It will depart NAS Alameda at 0800, 15 April 1967 bound for Andrews AFB.

Reservations for seating on the aircraft may be requested by contacting in writing or by phone the Professional Division, Code 31, Bureau of Medicine and Surgery, Navy Department, Washington, D.C. (Telephone Extension: OX 6-1834). Scheduled

dates are tentative and requests will be considered on a first come basis. Requests should be submitted as soon as possible.

STATION HOSPITAL RE-ACCREDITED

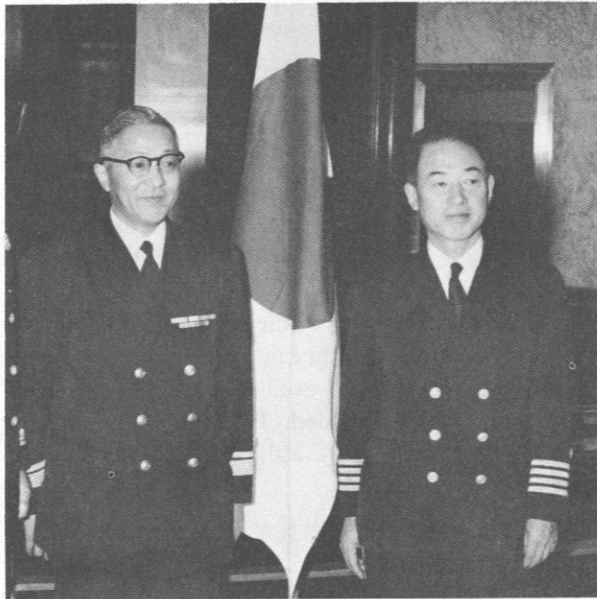
The Commanding Officer of the Naval Submarine Medical Center, Naval Submarine Base, CAPT C. L. Waite MC USN, received notification from the Joint Commission on Accreditation of Hospitals that the Station Hospital of the Submarine Medical Center had been re-accredited for a period of three years. This is the only Station Hospital of the Navy so accredited.

The Surveyor, J. Allston Clapp, Jr. MD of the Joint Commission conducted a comprehensive survey of the Station Hospital on 8 November 1966. A report of his survey along with his recommendations was sent to Commission headquarters in Chicago

where a review was conducted by approximately 30 physician commissioners.

CAPT J. W. Troy MC USN is Senior Medical Officer of the Station Hospital and the Chief of the Medical Staff. LCDR E. Vance Farnsworth MSC USNR is the Administrative Officer. CDR Louise Bareford NC USN is Chief Nurse and Director of Nursing.—Station Hospital, Naval Submarine Medical Center, Naval Submarine Base New London.

TOP JAPAN MEDICAL OFFICERS VISIT U.S. NAVAL ACTIVITIES



—Official U.S. Navy Photograph.

RADM Koichi Minobe (Medical Officer, Japanese Maritime Self-Defense Force) and CAPT Yoshitsugu Hiruma (Medical Officer, Japanese Maritime Self-Defense Force) arrived in San Francisco on 14 January to begin conferences with nearly 30 Naval Commands. Discussions included selection procedures, procurement, medical logistics and administration as well as professional medical matters. In addition to Naval Medical Commands, their itinerary included several civilian hospitals.

CARDIOVASCULAR PATHOLOGY COURSE

The Cardiovascular Pathology Course will be held at the Armed Forces Institute of Pathology, Washington, D.C., on May 1-5, 1967. The course is intended for interested clinicians, radiologists, and pathologists. It will consist primarily of a series of lectures delivered by staff members and visiting doc-

tors on both congenital and acquired heart diseases.

Applications should be made through The Director, Armed Forces Institute of Pathology, Washington, D.C. 20305. There is no fee for the course. Acceptances are limited to the first 300 applicants.

A program will be furnished upon request.—AFIP, Washington, D.C.

SPECIAL NAVAL TREATMENT CENTERS FOR MELIOIDOSIS

The Surgeon General of the Navy has designated three naval hospitals to provide specialized treatment and care to patients returned from Vietnam with the rare and exotic disease called "Meliodosis."

On 20 January 1967, the U.S. Naval Hospitals at Great Lakes, Illinois, Oakland, California, and Bethesda, Maryland were designated to treat melioidosis patients. Usually, these will be Navy and Marine Corps personnel who contract the disease in Vietnam. Patients will be immediately evacuated to the above named continental United States hospital nearest to their home.

Melioidosis does not pose a major threat to our forces, but is a serious disease. It is a disease of wild rodents and some domesticated animals, but the organism that is responsible for this infection is found widely distributed in nature. Animal droppings deposit the organism in water and mud where man and animals may acquire them. Organisms survive for long periods in rice paddies and on river banks. The disease manifests itself in chronic abscess formation, draining ulcers that will not heal, a fulminating septicemia, or in acute stages, pneumonia. The disease responds poorly to antibiotic therapy.

The treatment centers will present a unique opportunity to study and bring the best treatment to bear on this disease.—Public Affairs Office, BuMed.

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Fellowship in the American College of Surgeons

CAPT Paul H. Sebrechts MC USN

CDR Frederick Jackson MC USN has written "The Pathophysiology of Head Injuries" for Clinical Symposia volume 18 (July-December 1966) which is illustrated beautifully by F. Netter—Perusal is recommended—Another issue, March 1967 will deal with treatment of head injuries.—Editor.

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