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1. PURPOSE: To provide information of interest and assistance to medical services of the U. S. Armed Forces in RVN.

2. GENERAL: This headquarters does not necessarily endorse the professional views or opinions that may be expressed in this pamphlet apart from official notices. The contents of this pamphlet are not directive in force.

(AVHSU)

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DEDICATION

*****

We would like to dedicate this Surgical Compendium Issue of the USARV Bulletin to all the men and women, medical and paramedical, who have devoted their time and energies to the care and relief of suffering of the wounded both military and civilian.

ANNOUNCEMENT

A Surgical Society of Vietnam is being organized. All those in the surgical specialties will be eligible for membership. An appropriate certificate has been designed and will be available for a token price in the near future.

It is planned to have at least one annual informal social gathering in conjunction with the American College of Surgeons meeting. See you in Chicago in October.

JAMES P. GEIGER
COL, MC
Surgical Consultant

USARV SURGICAL COMPENDIUM

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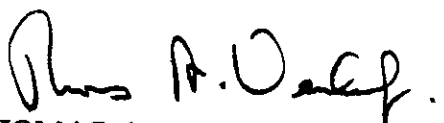
INTRODUCTION

In this present day and age of highly sophisticated surgical procedures it is only fitting and proper that adequate dissemination be given to the new ideas found by experienced surgeons.

This compendium is intended to record and disseminate the experience gained in the surgical field during this prolonged conflict.

It is intended that this volume will be of aid to the newly arrived surgeons who will be facing problems not usually encountered in a training program. It is hoped that the solid principles learned from past experiences will be followed.

It is also intended that this volume will stimulate others to share the experience they have gained while in Vietnam with others via this medical journal. It is therefore hoped that the surgical compendium will become a yearly publication similar to the medical compendium.



THOMAS A. VERDON, JR.
LTC, MC
Editor

SELECTED TOPICS OF SPECIAL SURGICAL INTEREST

JAMES P. GEIGER, COL, MC*

This issue of the USARV Bulletin is an attempt to compile an issue devoted entirely to surgical problems. The concept is similar to that of the Medical Compendium, but initially will differ slightly since several recent issues offer excellent and detailed accounts of neurosurgical, vascular, and orthopedic injuries.

A compromise solution was sought in order to provide a "compleat" Surgical Compendium. A reference list or surgical bibliography of topics from issues of past Bulletins is offered; these topics are of particular interest to surgeons. This list can be used not only as a guide to previous material, but may also suggest additional subjects for future contributors to the Bulletin. **

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MANAGEMENT OF INTRA-ABDOMINAL SEPSIS

FREDERICK G. WINEGARNER, MAJ, MC*

INTRODUCTION

The mortality rate for the wounded combat soldier in Vietnam has approached a miraculous two per cent. Modern technical skills, excellent support, and helicopter evacuation have all contributed to saving patients whose wounds would have been fatal in other wars. Patients with injuries of abdominal organs have presented challenging initial problems. Intra-abdominal sepsis has been a common and most devastating complication.

This discussion concerns the management of 75 patients with intra-abdominal sepsis requiring 116 procedures for surgical drainage over a two and one-half year period. This group consists of 56 patients wounded in Vietnam and 19 patients with intra-abdominal sepsis from other diseases treated at the US Army Hospital, Camp Zama, Japan.

Early diagnosis and agressive treatment of intra-abdominal sepsis is stressed. Complications frequently seen with massive intra-abdominal sepsis are discussed. Surgical management of these patients and preventive measures are presented.

MATERIAL

The US Army Hospital, Camp Zama, Japan is one of several large hospitals in Japan which treats patients who have received their initial therapy in Vietnam. Army personnel and their dependents stationed in Japan also receive medical treatment at this hospital.

From January 1, 1967 through June 30, 1969, 75 patients were operated for intra-abdominal sepsis. With only a few exceptions, the age range was from 18 to 25 years of age. 56 patients had injuries as a result of hostile fire and 19 had presented with various surgical diseases (see Fig. 1). 20 of the 75 patients with intra-abdominal abscesses had more than one surgical procedure in an attempt to control intra-abdominal sepsis. The total number of procedures done for control of intra-abdominal sepsis was 116.

* Formerly Chief of Surgery, US Army Hospital, Camp Zama, Japan. Present address, Division of Surgery, Denver General Hospital, West 6th and Cherokee Street, Denver Colorado 80204.

ABDOMINAL ABSCESS

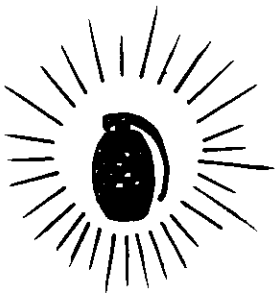
	# PATIENTS		
	29		12
	27	OTHER	7
TOTAL	56		19

Figure 1

The 56 patients injured as a result of hostile fire will be considered first. 29 patients received gunshot wounds of the abdomen and 27 received fragment wounds. The most common abdominal organs injured were: the colon in 48% of the patients, the liver in 41%, and the small intestine in 37%. In order of decreasing frequency the following organs were also injured: rectum, spleen, stomach, pancreas and bladder, kidney, and ureter. 39 patients or 70% had more than one visceral injury (see Fig. 2).

The most common place for the development of an intra-abdominal abscess was the pelvis and in these 14 patients the rectum and the small bowel were the most common organs injured. 13 patients had left subphrenic abscesses and the most frequently injured organ was the colon. Injuries of the liver were the most common cause of right subphrenic abscesses in 11 patients. Eight patients had multiple intra-abdominal abscesses from

injuries to the colon in five patients, the small bowel in four patients, and the liver in three patients. Four patients had right lower quadrant abscesses from colon and small bowel injuries and four had intrahepatic abscesses following liver injuries. Two patients had laparotomy wound abscesses with intraperitoneal extensions (see Fig. 3).

In the group of 19 patients who had intra-abdominal abscess from diseases other than wounds, 12 patients had abscesses following rupture of the appendix. The other nine patients had abscesses following biliary surgery in two patients, sympathectomy in two patients, and ligation of the inferior vena cava, gastric surgery, and colostomy closure in one each. The most common site for abscess formation was the right lower quadrant in eight patients. Four patients had pelvic abscesses; three retroperitoneal abscesses; two had right subphrenic abscesses; and one

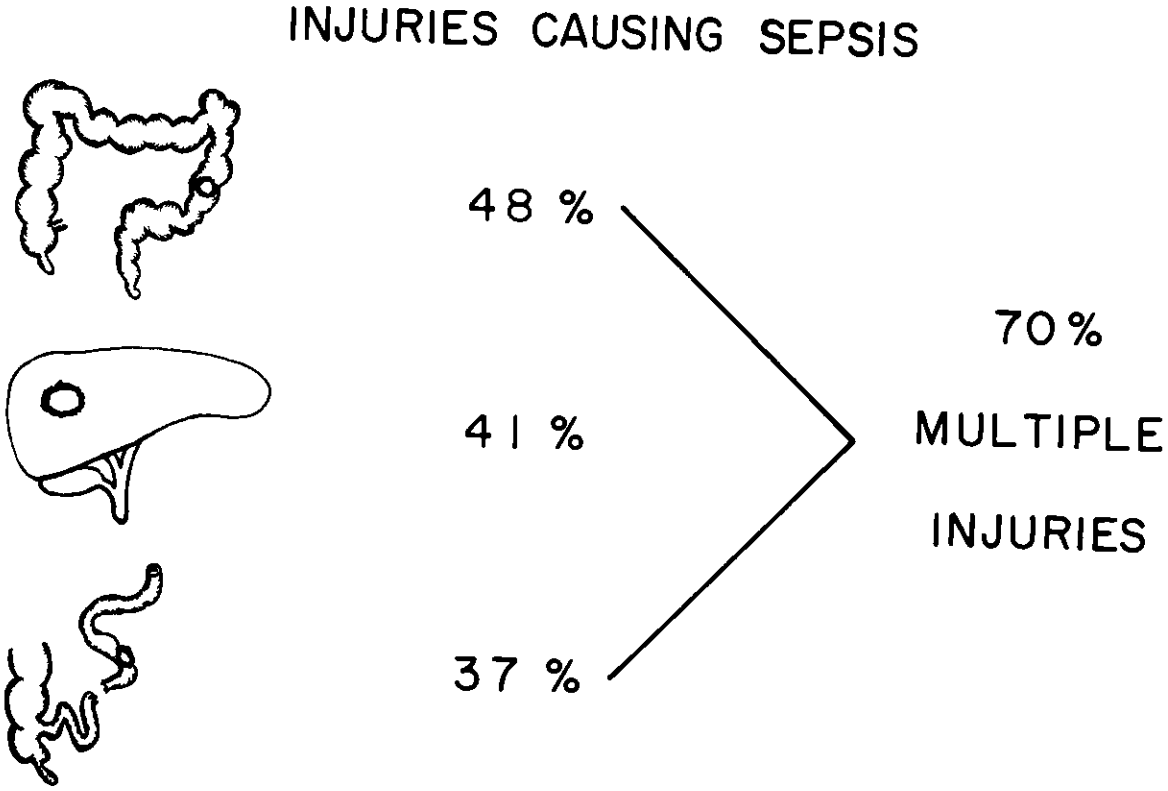


Figure 2

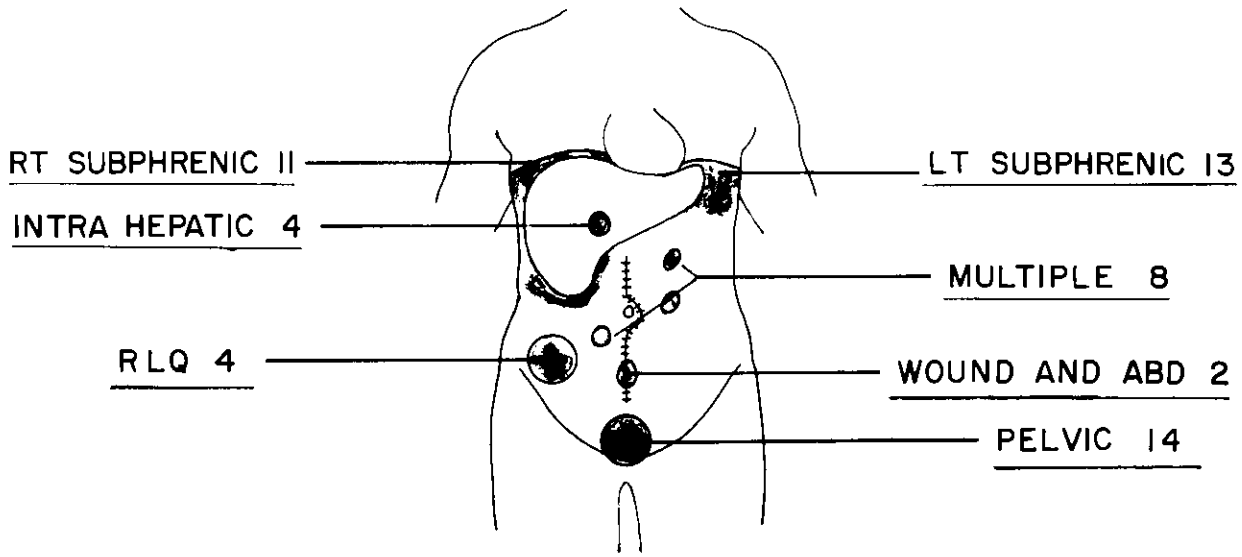


Figure 3

each, multiple abscesses and left subphrenic abscess.

Culture results are available in only 39 of the 75 patients. In this type of medical facility, the detailed records are passed on with the patient to the next medical facility. Culture reports are available on 31 of 56 patients with abscesses following wounds. Two-thirds of these patients showed a growth of more than one organism. Two-thirds of the patients had a Klebsiella-Aerobacter, 50% Escherichia Coli, and 33% had a Proteus or Pseudomonas organism (see Fig. 4). Only eight of the 19 patients with abscesses following non-combat wounds had culture results available and Escherichia Coli was found in 50% of these.

20 patients (27%) of the total of 75 required more than one surgical drainage

to control their infection. These patients had a total of 61 operative procedures or approximately three procedures apiece. The location of the abscesses in these patients were: five right subphrenic, four pelvic, four multiple abscesses, three left subphrenic and intrahepatic, and two right lower quadrant. Two patients with intrahepatic abscesses had the abscess missed at the first exploration. The most common organ injury in this group of patients was the colon or rectum in 13 patients. No specific organism could be found to predominate in these 20 patients requiring repeated surgery.

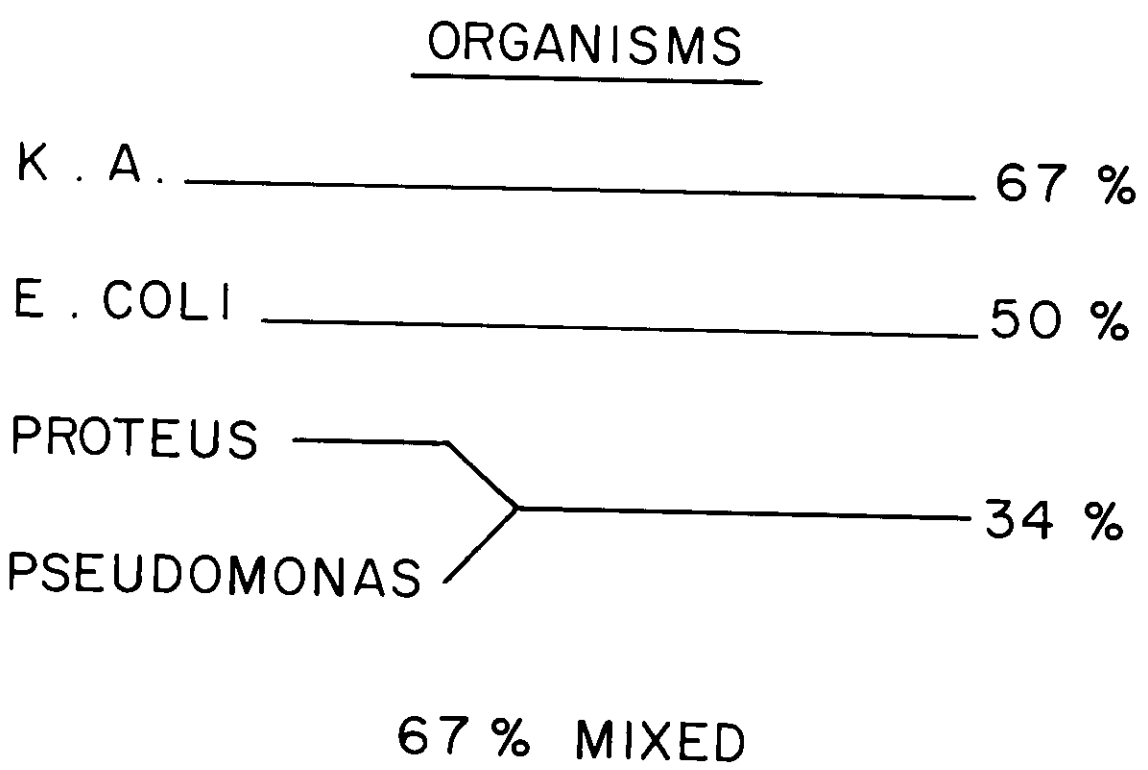


Figure 4

Several patients had their sepsis as a result of a specific surgical procedure. Four patients developed abdominal abscesses following a right colectomy with ileo-colostomy for right colon injuries. All of these patients had leaking ileo-colic anastomoses and required five or more procedures in an attempt to control their infection. One of these patients was among

Figure 5

the three who died.

Three patients had abscesses as a result of cecostomies done for wounds of the cecum. One of these patients had a right lower quadrant abscess associated with false aneurysm of the external iliac artery.

Of the 23 patients who had abscesses after liver injuries, only four had a T-tube inserted in the common bile duct. * At this hospital two patients had T-tubes inserted in an attempt to control a biliary fistula. Only one of the four patients with intrahepatic abscesses following liver wounds had

* See article and editor's note re this problem: Liver Injuries in Vietnam, Guernsey and Fisher.

had T-tube drainage (see Fig. 5).

20% of these 75 patients developed small bowel obstructions during the course of their illness. Eight patients had obstructions secondary to abscess and seven had obstruction secondary to adhesions. All of these patients required surgical relief of their bowel obstructions. Several patients had a second bout of obstruction. Four patients developed stress ulcers of the stomach requiring surgical intervention. Pyloroplasty and vagotomy with oversewing of the ulcers controlled the bleeding in all four cases.

Seven patients had pelvic abscesses drained through the antetior rectal wall into the rectum. Ten patients had a pelvic abscess drained by removing the coccyx and draining the presacral space with a large dependent opening. ** Subphrenic abscesses were drained through the subcostal extraserous approach. Whenever possible, abscesses were drained extraserously. When multiple abscesses were suspected the entire abdomen was explored.

Unusual findings in this group of 75 patients were gangrenous acalculous cholecystitis in three patients. Two patients had perforation of the gallbladder and presented as right upper quadrant abscesses. Two patients developed small bowel perforation near intra-abdominal abscesses during the course of their illness. Four patients had repeated disruption of gastric and small intestinal suture lines associated with their sepsis. Two of these patients expired.

There were three deaths in the entire group of patients for a two per cent patient mortality and a two per cent operative mortality. Two patients died of unrelenting sepsis after seven surgical procedures on one patient and five on the other. Spontaneous small bowel perforations and multiple abdominal abscesses were present in both patients. One patient also had a small bowel obstruction, multiple gastric stress ulcers, and a perforated gangrenous gallbladder in addition to his initial abdominal abscess and fecal fistula. The other patient had a false aneurysm of his right external iliac artery treated with ligation and a femoral artery to femoral artery vein graft.

The last patient had a massive pulmonary embolus following treatment for an empyema, right subphrenic abscess, biliary-bronchial-pleural fistula, and a small bowel onstruction.

** See article and editor's note re this problem: Coccygectomy, Winegarner

DISCUSSION

The diagnosis of intra-abdominal sepsis can be made early if the index of suspicion is high. Patients who are seen after abdominal procedures who have fever, abdominal pain, or purulent drainage must be carefully evaluated. Since wounds of the liver, colon, and small intestine are frequently associated with abdominal abscesses, patients with wounds of these organs are highly suspect. A frequent clue will be a large gush of purulent material following the removal of a previously placed abdominal drain. A history of shoulder pain from diaphragmatic irritation can frequently be elicited. Careful examination will frequently show localized pain or a mass.

Plain films of the chest and abdomen are quite helpful in finding and localizing an intra-abdominal abscess. We have found that the injection of draining sinuses with radio-opaque material has been the most helpful diagnostic procedure for demonstrating the presence and localization of an abscess. Not infrequently, unsuspected communications with abdominal viscera are found.

After the diagnosis of an intra-abdominal abscess has been made, aggressive therapy is started. Cultures are obtained whenever a draining sinus is found. As previously mentioned, the organisms found are usually a mixture of gram negative organisms. Previous studies (1-5) show a predominance of Staphylococcus organisms with a small per cent of patients showing a mixture of organisms. Klebsiella-Aerobacter, Escherichia Coli, Proteus, and Pseudomonas organisms predominate in our patients and therefore broad spectrum antibiotic coverage is necessary. All patients arriving from Vietnam who have had intra-abdominal organ injuries have been previously treated with antibiotics. The organisms that persist are frequently resistant to antibiotics. * Previous antibiotic therapy and the high incidence of colon injuries may explain the predominance of gram negative organisms in our patients.

In preparation for surgery, patients are hydrated with intravenous fluids and given blood whenever the hemocrit is low. Early surgical drainage is advocated.

Whenever multiple abscesses are suspected, the entire abdomen is explored. When a localized abscess is found, extraserous drainage is done. Pelvic abscesses are drained through the rectum or by removal of the coccyx and

* Editor's note re prophylactic antibiotics.

and wide open, presacral drainage. Any leaking anastomoses are exteriorized at the time of abdominal drainage.

Leaks from the stomach or proximal small bowel are exceptions to the rule of exteriorization at the time of the first exploration and drainage. If a subsequent suture line leak develops, exteriorization is done. The liver must be carefully examined for intrahepatic abscesses. If a biliary fistula is present, T-tube intubation of the common bile duct should be considered. The T-tube allows evaluation of the biliary fistula postoperatively by cholangiography and diverts bile away from the biliary fistula.

When drains are placed, large stab wounds should be made which will loosely accomodate the drains. Dependent drainage is ideal but invariably difficult to obtain. Sump tubes have been useful in deep pockets and for genitourinary wounds.

Undebrided wounds of the back muscles including the ileo-psoas muscle and of the pelvis have been found frequently, and these wounds should be carefully debrided and drained.

The postoperative management of drains and tubes is quite important. Drains should be kept open and withdrawn as the abscess cavities close.

Patients who continue to have fever after the first few postoperative days must be suspected to have another abscess. 27% of the patients had abscesses requiring further drainage. In addition to fever, continuing weight loss and abdominal pain have been seen in patients with continued infection. Patients who have had colon wounds are the most likely to have recurrent abscesses.

Postoperatively, patients must be watched for gastric stress ulcers and mechanical small bowel obstruction. 20% of the patients had a bowel obstruction during the course of their illness, and four patients had gastric stress ulcers.

Fever, upper right quadrant pain, and leukocytosis should make one consider cholecystitis since this unusual complication has been seen in three patients with abdominal sepsis.

Several things may be considered in an attempt to prevent intra-abdominal sepsis from developing following multiple organ injuries. Liver wounds which are more extensive than superficial lacerations should be treated

with T-tube intubation of the common bile duct. Back wounds should be more thoroughly debrided. This is often overlooked after management of catastrophic visceral injuries. Patients with wounds of the pelvis, rectum, and bladder may benefit from coccygectomy and wide dependent pelvic drainage rather than the usual small penrose drains brought out through a stab wound in the presacral space.

The question of the use of prophylactic antibiotics comes up. This practice undoubtedly causes infection from highly resistant organisms to develop. The use of antibiotics might be better regulated to specific indications rather than used in every case. *

Better management of drains placed at the time of original surgery is necessary. Drains must be kept open by moving them or irrigating them. The drain site must be large enough to accomodate the drains loosely and should be dependent whenever possible.

SUMMARY

The management of 75 patients requiring 116 surgical drainage procedures for intra-abdominal abscesses over a two and one-half year period is presented. 56 of the patients were wounded by hostile fire in Vietnam and 19 had abscesses from illness other than wounds. Early diagnosis and agressive therapy are stressed. Surgical treatment and preventive measures are discussed.

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Editor's Note #1

As I have been preaching all over the country, the gram negative bacteria rapidly become resistant to the antibiotics we use. Therefore, it is imperative that we carefully evaluate the etiology of our infections at each hospital to see what is the most likely offending organism and what antibiotics it is most likely to respond to. Shotgun reliance on antibiotic combinations that are used without consideration for the offending organism is to be condemned. Only through a rational approach and careful, judicious use of antibiotics will we be able to overcome the problem of resistant bacterial infections.

T. A. V.

Editor's Note #2

Antibiotics administered to a patient with a grossly contaminated wound should not be confused with those administered prophylactically in clean elective surgical cases. It is therefore USARV policy that all patients with other than minimal wounds shall receive a "rational antibiotic regimen". This is generally felt to exclude routine use of streptomycin and combinations of penicillin and chloromycetin except for neurosurgical cases.

J. P. G.

Maturity is many things. First it is the ability to base a judgement on the Big Picture - the Long Haul. It means being able to pass up the "fun-for-the-minute" and select the course of action which will pay off later. One of the characteristics of infancy is the "I want it now approach". Grown-up people can wait.

THE MANAGEMENT OF WOUNDS OF THE RECTUM

DONALD SEBESTA, MAJ, MC*

Among the wounds seen in Vietnam, penetrating wounds of the rectum are most frequently mismanaged. Because wounds of the rectum are uncommon in civilian practice most surgeons coming to Vietnam need training in proper management of these injuries to prevent occurrence of a potentially fatal pelvic sepsis.

The diagnosis of a rectal injury is difficult and requires rectal examination, use of bi-directional x-rays as well as sigmoidoscopy. A negative sigmiodoscopic examination alone is of little value because small wounds are not easily distinguished by this method. Because of these difficulties in diagnosis, even a strong suspicion of a rectal injury should be sufficient to call for a definitive treatment, even when injury cannot be demonstrated on the operating table. Small, often imperceptible perforating wounds of the rectum still have the potential to cause pelvic sepsis and death.

To allow a combined abdominoperineal approach, the patient should be in the lithotomy position. After opening the pelvic peritoneum, the surgeon should separate the rectum from the surrounding pelvic soft tissue by gentle blunt dissection to the level of the coccyx, posteriorly, and that of the prostate gland, anteriorly. All identifiable wounds of the rectum should be closed, preferably in two layers. Next, a complete diverting colostomy should be performed, preferably by subdividing the colon and bringing the severed ends out through separate incisions away from the midline incision. Careful cleaning of the colon distal to the colostomy is necessary to insure removal of all residual stool. This is best done by copius irrigation with saline through both the anus and mucus fistula. If this important step is overlooked, the colostomy will be of little value. Proper perineal drainage is of great importance in the successful treatment of rectal injuries and requires that the presacral space be opened through a generous incision posterior to the anus; a coccygectomy should be done in all cases to provide adequate drainage, since experience shows that a coccygectomy will eventually be required anyway to allow adequate drainage and secondary wound closure. Either penrose or sump drains may be used. The abdominal cavity should be irrigated thoroughly with several liters of saline. Closure of the pelvic peritoneum is desirable

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and drainage of the abdominal cavity is optional.

The treatment of rectal injuries as outlined above at the 67th Evacuation Hospital has measurably reduced the previously experienced complications from this injury. Surgical services should familiarize all new surgeons in Vietnam with the above outlined management of rectal injuries.

Editor's Note

The above comments were expressed by Major Sebestra prior to his return to CONUS. The principles were applied with uniform success in a number of combined pelvic and rectal wounds. He did not provide a completed manuscript prior to his departure. Since it deals with a wound that is frequently treated inadequately, I have taken the liberty of extracting the information from the Operations Report of Lessons Learned (ORLL) of the 67th Evacuation Hospital.

A patient seen recently with this injury did not have the distal limb of the colon cleansed. He developed a pelvic abscess when the recto-sigmoid repair broke down. A course of progressive sepsis, slough of the rectum and hemorrhage culminated in bactermia and death.

The principles of secondary pelvic drainage with coccygectomy is described in detail in the following paper. The author has elected the prone position for a secondary drainage procedure but the lithotomy as described by Doctor Sebesta is ideally suited for primary care.

To date we have had no cases of osteomyelitis recorded in RVN, PACOM, or CONUS hospitals. There have been numerous cases of inadequate pelvic drainage when coccygectomy is not done.

J. P.G.

Maturity is the ability to make a decision and stand by it. Immature people spend their lives exploring endless possibilities and then do nothing. Action requires courage. And there is no maturity without courage.

COCCYGECTOMY FOR DRAINAGE OF PELVIC ABSCESSES FOLLOWING PELVIC WOUNDS

FREDERICK G. WINEGARNER, MAJ, MC*

INTRODUCTION Almost all of the casualties inflicted in Vietnam have been from small arms fire such as pistols, rifles, and machine guns or high and low velocity fragments from grenades, mines, or mortars. High velocity missiles from small arms or other weapons of war cause extensive soft tissue injury regardless of their size.

One of the most difficult areas to treat adequately is the pelvis. High velocity wounds of the pelvis usually injure multiple viscera as well as extensive amounts of bone and soft tissue. The pelvic organs are crowded together and good exposure of the injuries is difficult. The surgeon frequently is not as aggressive as he should be in debriding the bladder, ureters, rectum, and pelvic bone. Good drainage of this contaminated, deep cavity is hard to obtain. Coccygectomy with wide open, dependent drainage through the presacral area is suggested as a means of establishing pelvic drainage at the time of the initial surgical debridement or later for drainage of pelvic abscesses.

MATERIAL From January 1, 1967 through June 30, 1969, 56 patients were seen at the US Army Hospital in Camp Zama, Japan for treatment of abdominal sepsis following wounds of abdominal viscera from hostile fire in Vietnam. All of these patients had received their initial treatment in Vietnam. The most common site of abscess formation in this group of patients was the pelvis. Fourteen patients (25%) had pelvic abscesses requiring surgical drainage. Ten patients with pelvic abscesses had coccygectomies to establish dependent pelvic drainage. These ten patients are considered in this discussion.

All of the ten patients had wounds of the colon; nine had wounds of the rectum. Five patients had wounds of the small bowel and significant pelvic fractures. Genitournary injuries were common. Four patients had wounds of the bladder and one had a ureteral injury. Vesicocutaneous fistulas were seen in two patients and a vesicorectal fistula in another.

The offending organisms were a mixture of gram negative rods in every case. Klebsiella-Aerobacter, Escherichia Coli, Pseudomonas, and Proteus organisms predominated.

* Author of Management of Intra-Abdominal Sepsis,

The patients with bladder injuries were treated in Vietnam with debridement and closure of the bladder. In all but one of the five patients a suprapubic cystostomy was done. The bladder was drained anteriorly and a urethral catheter was inserted. The one uretral injury was overlooked initially. The wounds of the rectum were treated by debridement and suture whenever possible, and proximal colostomy. The small bowel injuries were treated by debridement and suture or resection and anastomosis. Two patients had drains brought out from the presacral space to the area between the coccyx and the rectum. In neither of these two patients was this presacral drainage adequate.

One patient developed brisk rectal bleeding from a lower posterior wound. Coccygectomy was used to expose, debride, and suture this rectal wound.

In nine patients. coccygectomy was done as the first procedure to obtain pelvic drainage. In one patient debridement of the prevesicle space and suprapubic cystostomy had been done six weeks earlier. Excluding the patient who had a six week delay before coccygectomy, the average interval between the time of admission and coccygectomy was three days.

One patient in this group of ten died of unrelenting intra-abdominal sepsis. Coccygectomy established wide open, dependent drainage in all cases, and helped to keep the pelvic cavity free of urine and purulent exudate. Injured tissues and fistulas were allowed to heal spontaneously with the sepsis controlled.

DISCUSSION Kraske (1) as quoted by Shackelford (2) has described coccygectomy as an approach to the low rectum. Longheed and White (3) have described coccygectomy as a means of draining the presacral space in patients with tuberculous disease of the spine.

The surgical procedure is a simple one. The patient is placed in a prone position with his hips flexed (see Fig. 1). The buttocks are spread apart with adhesive tape. A linear incision is made from over the lower sacrum to a point two centimeters above the anus (see Fig. 2). The incision is carried down to the coccyx and the soft tissues are separated from the coccyx. The coccyx is disarticulated from the sacrum. A plane is developed between the sacrum and the rectum (see Fig. 3). The abscess is frequently in the immediate presacral space. At times, dissection must be carried to either side of the rectum until the abscess cavity is entered. Post-operatively, the pelvic abscess is treated with irrigations. If there is a genitournary fistula, suction catheters are fre-

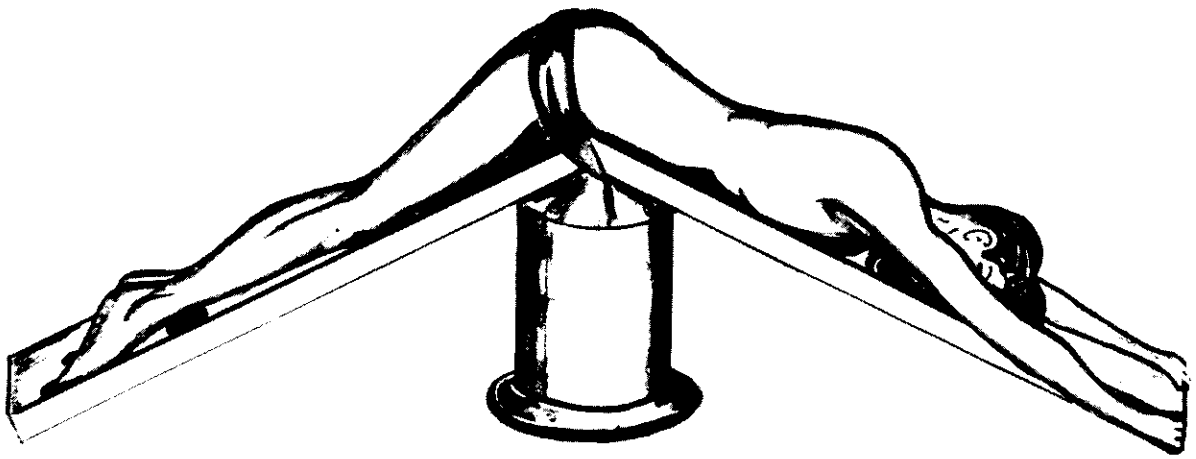
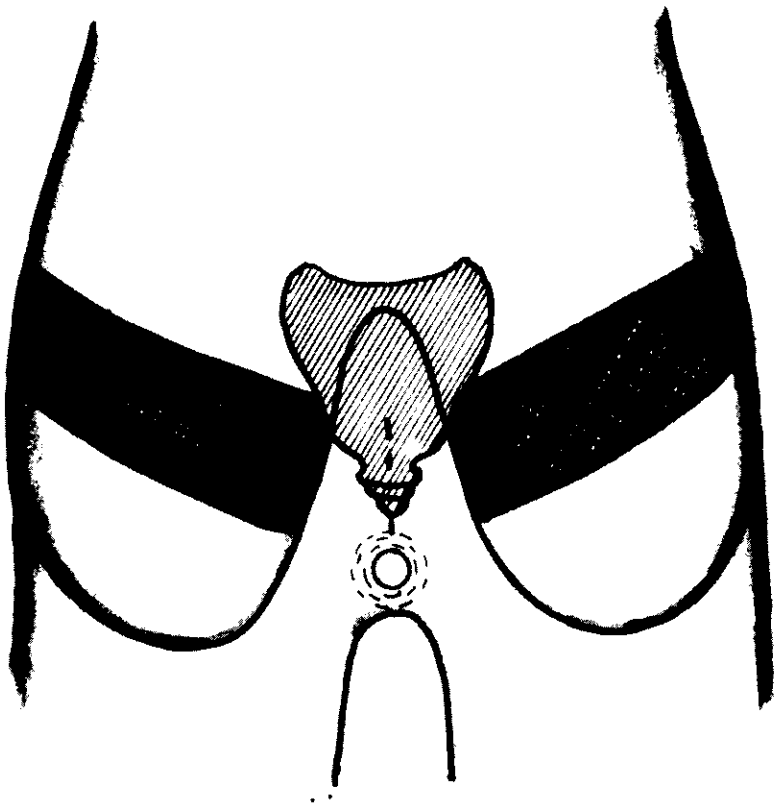


Figure 1

quently most helpful in keeping the pelvis dry. As the infection subsides and the fistula closes, the presacral space heals spontaneously.

Coccygectomy with wide development of a space between the rectum and the sacrum has been found to give excellent, wide mouthed, dependent drainage of the pelvis in patients with high velocity missile wounds of the pelvis who developed pelvic infection.

If adequate pelvic drainage were established by coccygectomy at the time of the original debridement, most instances of pelvic abscess could be avoided.



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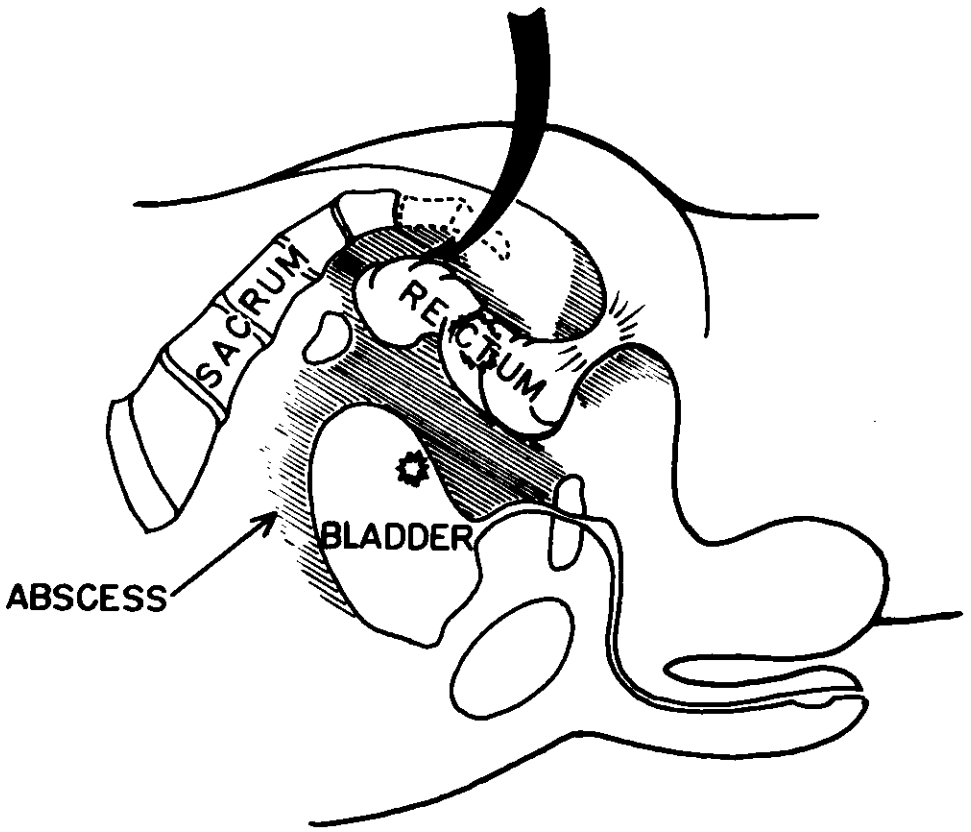

Figure 3

SUMMARY Ten patients who had extensive soft tissue, bony, and visceral injuries from high velocity missile wounds of the pelvis were seen with pelvic infections. Adequate drainage of the pelvis is difficult to obtain. Coccygectomy with presacral drainage of the pelvis has been found to give excellent, wide open, dependent pelvic drainage in these patients.

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ALWAYS ROOM FOR IMPROVEMENT

GRAHAM YELLAND, MAJ, MC

SP/6 ARTEMIO MARTINEZ

95th Evacuation Hospital

Have you ever heard of the Martinez-Yelland gastric tube? This tube was improvised to evacuate stomach contents which were thick and tenacious. Several extra holes were cut in a soft plastic urinary drainage tube of a large bore. The edges of the holes were rounded off by flaming them with a cigarette lighter. The tube was passed P. O. into the patient's stomach, and the contents easily removed by irrigation.

Editor's Note

In this culture, where rice is a staple, this tube may be used as a substitute for the standard Ewald Tube, FSN 6515-386-5800.

PULMONARY RESECTION: THE TREATMENT OF CHOICE FOR PULMONARY CONTUSION DUE TO HIGH VELOCITY THORACIC WOUNDS
(A Preliminary Report)

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Penetrating or perforating wounds of the thorax are initially treated by closed tube thoracostomy with a Hemlick valve or water-seal drainage. Other accepted principles of wound debridement and resuscitation also apply in these injuries. The standard indications for open thoracostomy in pulmonary wounds have been persistent major bleeding or gross air leak that cannot be controlled by closed thoracostomy.

Recent adverse experience with major pulmonary contusion accompanied by lobar consolidation and gross or fatal hemoptysis has prompted us to include these manifestations as additional indications for thoracotomy. Case histories will be presented to illustrate the application of this new indication for thoracotomy in preference to conservative therapy.

CASE I

A 22 year old soldier presented with multiple wounds from a mine explosion. He was in cardiac standstill upon entering the receiving area but responded to rapid blood and fluid replacement and open chest cardiac massage. There were traumatic amputations of the right leg and arm, and an avulsing wound of the left thigh with loss of six inches of femoral artery. A tangential of the upper left chest and axilla had avulsed five inches inches of the axillary artery. On inspection the left upper lobe showed only minimal contusion; he was taken directly to surgery without a preliminary x-ray.

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The amputations of the right extremities were completed and saphenous grafts were placed in the femoral and axillary arteries. His general condition was precarious due to continued hemoptysis and difficulty clearing the air way. The left upper lobe had enlarged to twice its normal size and completely infarcted within one hour. Resection of the left upper lobe was attempted but occlusion of the left bronchus and pulmonary artery precipitated a series of cardiac arrests from which he could not be resuscitated . Death was attributed to hypoxia due to inability to obtain a blood free air way to the right lung.

CASE II

This 22 year old soldier sustained a S. I. W., M-16 wound of the right chest (velocity 3200 feet per second). He was in good general condition on admission approximately 30 minutes post-wounding. He had a closed tube thoracostomy and the usual resuscitative measures. There was extensive sub-cutaneous air with a moderately severe air leak and hemoptysis. The chest x-ray showed shattering of the 3d to the 5th ribs, and contusion of the right upper lobe. Right posterior lateral thoracotomy was performed and chest wall bleeding controlled. The upper lobe developed changes of a hemorrhagic infarction in approximately 10 minutes. This change, in conjunction with the hemoptysis, air leak, and laceration indicated an upper lobectomy. His post-operative course was uncomplicated and he was evacuated on the eighth day.

Examination of the resected lobe revealed complete consolidation with blood in the bronchus. Microscopic sections showed the alveoli to be disrupted and filled with blood. There was severe peri-vascular and peri-bronchial hemorrhage with extension into the sub-mucosa.

CASE III

A 20 year old soldier presented with tangential penetrating M-16 GSW of the left thorax. The round went through the upper posterior lateral aspect of the left chest but did not enter the chest. Emergency tracheostomy and tube thoracostomy were performed for hemoptysis and massive air leak. X-rays demonstrated extensive destruction of ribs 3, 4, and 5 with opacification of the left lung and extensive sub-cutaneous emphysema. Thoracotomy and a left lung pneumonectomy were performed because of consolidation and destruction of the entire lung. The post-operative course was marked by rapid recovery and absence of complications. Evacuation to Japan was accomplished on the 8th post-operative day.

Gross and microscopic examination was similar to Case Two.

DISCUSSION

In the past the indications for thoracotomy have been continued or massive chest bleeding and/or the presence of large air leaks. Whenever possible the mode of treatment used at thoracotomy was oversewing of the laceration. In the past pulmonary contusions have been relatively insignificant; thoracotomy and pulmonary resection have not been recommended. (1)

Most pulmonary injuries resulting from war wounds can indeed be treated without thoracotomy. During the period August 1968 through July 1969 at least 3,058 closed thoracotomies were performed in Vietnam as compared with 801 open thoracotomies. (2)

Tissue damage has been shown to be directly proportional to the projectile's mass and the square of its velocity. This is expressed by the formula for kinetic energy: K. E. = 1/2 MV^2. One tends to associate high velocity wounds with bullets. However, fragments may be of greater mass or have a higher initial velocity than bullets. Thus, one must also be alert to major pulmonary injury resulting from fragments.

Particularly devastating are both the direct and indirect tissue destruction caused by the high velocity AK-47 and M-16 bullets. We have collected six patients in whom an entire lung was destroyed by a tangential bullet wound in which the bullet did not directly penetrate the thoracic cavity. In three of these cases the lung was destroyed by direct trauma from the bullet fragmenting and sending rib spicules and bullet fragments into the lung. In the remaining three cases the lung was destroyed from the blast effect alone with neither fragments of the bullet nor bone fragments penetrating the thoracic cavity. The consolidation or hemorrhagic infarction produced has been associated with severe degrees of cyanosis and hypoxemia. This is due to loss of areating alveoli and a "right to left" shunt.

In view of these experiences, we have adopted the following indications for the performing of thoracotomy in pulmonary injuries.

(1) Excessive hemorrhage after closed thoracotomy.

(2) Massive or persistent air leak.

(3) Massive or continued hemoptysis.

(4) Hypoxemia with consolidation following pulmonary contusion.

We use the term "excessive hemorrhage to mean patients who are in hemorrhagic shock upon admission and those in whom closed thoracotomy fails to obtain the expanded lung without a significant residual hemothorax. Excessive hemorrhage may originate in the intercostal or internal mammary vessels and major cardiovascular or pulmonary sites. When in doubt these patients are prepared for thoracotomy and the entrance and exit wounds are debrided and bleeders ligated. Frequently the underlying pulmonary tissue can be adequately visualized after chest wall debridement to determine the need for formal thoracotomy. Massive air leaks, though rare, can indicate a major bronchial injury. Persistent air leak is more commonly due to penetrating pulmonary and segmented bronchial wounds. It has also occurred during the recovery phase in pulmonary contusions. This can be explained by the clearing of blood from torn alveoli and rupture of sub-pleural blebs which are seen in the resected specimens. In either case lung suture will rarely be successful in permanently controlling the air leak. Major bronchial repair is most successful if performed early post-injury. Gross hemoptysis usually results from lacerations of central pulmonary vessels and bronchi. Pulmonary contusions due to tangential wounds can also cause gross hemoptysis. This is thought to be secondary to alveolar wall and capillary disruption. Emergency lobar or pulmonary resection is required when the airway cannot be cleared of blood in any other manner. *

The roentgenographic demonstration of major degrees of pulmonary contusion with gross hemoptysis is difficult to assess as an indication for thoracotomy and pulmonary resection. There has been significant morbidity and mortality associated with large unresected pulmonary contusions since severe hypoxemia may result. In addition, the sequestered fluids in those functionless alveoli contribute to the development of bacterial pneumonitis. Persistent intrapulmonary cavity, abscess formation, and secondary hemorrhage are other major complications. Autopsies performed on patients dying after pulmonary injuries have impressed us that roentgenography minimizes the extent and severity of the pulmonary injury. This is especially true in the first few hours after wounding. In general, we consider resection when the roentgenogram demonstrates pulmonary consolidation involving one or more pulmonary lobes. The site of pulmonary contusion may temper our decision for thoracotomy in the absence of another indication for the operation. Because of the presence of dependent endobronchial drainage we are less likely to operate upon a patient in whom the contusion involves only one pulmonary apex. Additional laboratory and clinical data are being collected with determination of blood gasses and detailed examination of resected and autopsy material.

* A Carlens double lumen endotracheal tube is necessary for maintaining a blood-free air way in the case with gross hemoptysis.

Except for the treatment of air leaks not associated with extensive bleeding or significant pulmonary contusions, oversewing of the lung is rarely an adequate treatment for pulmonary injuries. Only rarely can the source of massive pulmonary bleeding be controlled by oversewing. Oversewing of visceral pleural lacerations in deeply penetrating pulmonary wounds may give the impression that the hemorrhage is controlled, however, in effect, only the visible exit site of the hemorrhage has been eliminated. The source of bleeding is not controlled and the hemorrhage continues until its source is compressed by the enlarging intrapulmonary accumulation of blood after closure of its pleural egress site. This accumulated intrapulmonary blood may then give rise to the same complications as do extensive pulmonary contusions.

Wedge resection can occasionally be used to control hemorrhage and to resect small peripheral areas of the disrupted pulmonary parenchyma. However, using our criteria for thoracotomy we have not found any pulmonary lesions amenable to wedge resection. If the wedge resection is large and/or unfavorably situated so as to prevent post-operative coaptation of the remaining lung and the parietal pleura with obliteration of dead space a post-operative empyema will usually occur.

In all of our cases pulmonary lobectomy or pneumonectomy has been required. Only once have we been forced to perform mass ligation of the pulmonary hilum to control massive hemorrhage.

Since this material was first discussed in Vietnam approximately 30 patients have had resections. Several of them had too liberal an interpretation of criteria for resection with less than optimal results. Others, for example, have shown dramatic clinical improvement with increase in Po_2 from 30mm Hg while on a respirator to 250mm on nasal O_2 after a pneumonectomy.

We realize that we are proposing a fairly radical approach but the procedure seems justified in view of the often unacceptable results with conservative treatment. Most recently we have relied primarily on physiologic evidence of shunting as a guide for thoracotomy and resection. Po_2 levels of 30mm Hg are not uncommonly seen in the more extensively contused lungs. Failure to show an increase of Po_2 to $>$ 60mm on nasal O2 seemed a reasonable initial criterion. We emphasize that these criteria are not to be interpreted as a carte blanche for thoracotomy in all patients with pulmonary consolidation secondary to contusion or perforating wounds. In the absence of a truly gross hemoptysis or excessive hemorrhage, complete consolidation of the middle and lower lobes, for example, can on occasion, be successfully treated conservatively. Frequently a thracheostomy is required for pulmonary lavage and toilet and respiratory assistance or control. These

patients will usually have blood tinged sputum for several days but will, after 72 hours, begin to clear their contusions both clinically and roentgenographically.

CONCLUSION

High velocity pulmonary wounds may require early or immediate resection when they are associated with hemorrhage, massive air leak, hemoptysis, and hypoxemia due to consolidation.

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2. Colonel James P. Geiger, MC, USARV Surgical Report, USARV MEDICAL BULLETIN, November - December 1969, p. 49.

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Maturity is the ability to stick with a project or a situation until it is finished. The adult who is constantly changing jobs, changing friends, and changing mates -- is immature. He cannot stick it out because he has not grownup. Everything seems to turn sour after awhile.

Maturity is the capacity to face unpleasantness, frustration, discomfort and defeat without complaint or collapse. The mature person knows he can't have everything his own way. He is able to defer to circumstances, to other people and to time.

LIVER INJURIES IN VIETNAM

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Despite their extensive training, few of the surgeons arriving in Vietnam have had much experience in the treatment of liver wounds. The purpose of this report is to present a treatment plan for hepatic injuries.

Classification of liver injuries:

Class 1. Small hepatic wounds without active bleeding or obvious areas of devitalized liver tissue.

Class 2. Superficial linear lacerations or fractures of the liver.

Class 3. Localized areas of devitalized hepatic parenchyma.

Class 4. Hepatic lobe destruction and extensive hepatic fractures and lacerations.

Principles of Treatment:

The three major objectives in the surgical treatment of live injuries are hemostasis, debridement, and the establishment of adequate drainage. Class 1 injuries only require drainage. Class 2 injuries require hemostatic, interlocking, mattress sutures and dependent drainage. Class 3 injuries need to be debrided in addition to achieving hemostasis and adequate drainage. The importance of debridement of devitalized hepatic tissue cannot be overemphasized. The failure to adequately perform this step frequently results in slough of necrotic tissue and the development of subphrenic and subhepatic abscesses.

The principles of debridement that we apply daily to other tissues also apply to the liver. The surgeon should remove devitalized liver tissue until hepatic tissue is encountered which is normal in color, consistancy, and circulation. The third principle of surgical treatment of hepatic injuries is the one most frequently violated by the novice. Adequate dependent drainage must be established. Class 1 and Class 2 injuries can be drained with large, soft rubber drains that are placed in both the subphrenic and subhepatic spaces and must exit posteriorly and be free from the possibility of contamination

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from colostomies. The 3d and 4th classes of injuries require the addition of one or more sump drains to the soft rubber drains.

Technical Considerations:

The extensive liver injury can present the surgeon with a considerable technical challenge. The decision to do a major hepatic resection must be nade early in the course of the operation before critical minutes are wasted in futile attempts to control bleeding with sutures. It is not rare for lives to be lost when the surgeon is not able to rapidly and accurately assess the situation and proceed with the proper procedure for any particular injury.

The old surgical adage, "You can do it if you can see it", has never been more applicable. Extensive hepatic surgery requires adequate assistance and exposure in order to be successful. Mobilizing the liver by incising the Falciform, the Coronary, and the right lateral ligaments is essential and greatly improves exposure. If bleeding from the liver is extensive the porta hepatis may require occlusion with a vascular clamp. Inflow occlusion to the liver should not exceed fifteen minutes for any one period. If left hepatic lobectomy or partial right hepatic lobectomy is needed it is usually not necessary to extend the abdominal incision into the chest. Occasionally a formal right hepatic lobectomy is required. We have been forced to do this operation on four occasions with two patients being long term survivors. This procedure required dissection of the porta hepatis with ligation of the right hepatic artery. Insertion of a probe into the common hepatic duct is helpful in identifying the right hepatic duct and protecting the left hepatic duct from injury. Once the liver has been debrided and hemostasis obtained by individual ligation of the major blood vessels, adequate catheter sump drainage must be assured.

Considerable disagreement exists over the need to decompress the biliary system after major hepatic surgery as recommended by Merendino, et al.* The use of hemostatic materials such as Gelfoam is to be avoided since these materials have been clearly shown by Madding (Ref. 2) to be sources of foreign body induced infections and late hemorrhage. On rare occasions hemostasis in the operative area of the liver cannot be maintained and the use of laparotomy pads as a hemostatic pack will be necessary. When this cannot be avoided the pack should be removed as soon as possible and never be left more than 72 hours.

* See Editor's Note

Critical Associated Lesions:

Prompt and correct handling of injuries to the lung and/or colon is especially critical in the successful management of patients who also have liver damage. A colostomy must not be placed in the right upper quadrant of the abdomen when the liver is drained since this frequently results in contamination of the drain sites with colon contents and will induce a retrograde drain site infection. When contusion of the lung is combined with a major hepatic resection a tracheostomy should be performed and the patient placed on the respirator during the post-operative period. This is almost always necessary even though the patient's respiratory status may seem adequate at surgery.

Post-Operative Care:

Blood and fluid replacement, management of coagulation defects, antibiotics, and careful attention to the respiratory status of the patient are the main areas of concern following major liver surgery. Out-of-country air evacuation should be planned only when the patient has near normal respiratory ability, is afebrile, has a normal blood volume, and a functioning gastrointestinal tract.

Summary:

The keys for the successful treatment of liver injuries are: one - control of hemorrhage; two - adequate debridement of devitalized hepatic tissue; three - adequate dependent drainage of the subphrenic and subhepatic spaces; four - prompt and effective treatment of associated injuries; and five - detailed post-operative care of the patient with a well timed air evacuation.

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Editor's Note

Recommended additional reference:

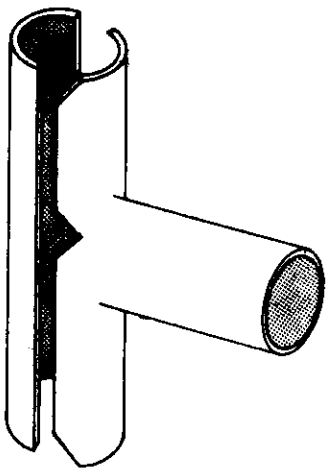
Surgery, 63:236, February 1968.

Surgical Clinics of North America, 48:1313 - 1335, December 1968.

American Journal of Surgery, 118-960 - 963, December 1969

Thoracoabdominal incisions often make the procedure easier and reduce the likelihood of air embolus by eliminating the negative intra-thoracic pressure. An unacceptable number of complications (subphrenic and intra-hepatic abscesses, hemobilia, intra-hepatic hematoma, etc.) have been reported from PACOM hospitals in those patients who had no biliary decompression. I feel that it is mandatory to drain the common duct in all but minor hepatic injuries. The T-tube should not be removed prior to evacuation! The intraluminal portion of the T-tube may be trimmed to reduce interference with the free biliary flow. (see diagram). Packing the wound for hemostasis usually leads to fatal sepsis and is justified only when all other measures fail, when used the patient must not be evacuated until removed by the original surgeon. In other words, don't pass the buck.

There have been a significant number of patients with associated severe contusions of the middle and lower lobes of the right lung, and I strongly endorse the author's recommendation for tracheostomy and respirator support. In addition, some patients have required lobectomy to control severe hemoptysis and/or hypoxemia due to shunting through the contused lung.



These patients have significant depression of the hepatic function and should receive supplements of 10% glucose during and after surgery. Post-operative electrolyte disturbances are usually minimal but supplemental albumin is also essential.

A STUDY OF SURGICAL DEATHS AT THE 2D SURGICAL HOSPITAL

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To begin a tour as an operating surgeon in a combat zone with two fatalities occurring in the first week while under the indoctrination tutelage of an 11 month Vietnam-veteran board certified thoracic surgeon is a traumatic experience. Particularly is this so to one who feels that his 17 years of training and surgical experience should be more than adequate preparation. I became involved in one fashion or another with all deaths occurring in this hospital because of my duties as Chief of Professional Services. Certain questions bothered me that I felt impelled to undertake some investigation of these cases. The results I would like to share with my colleagues in the war theatre.

SCOPE:

During a nine month period, from January through September 1969, the Second Surgical Hospital (Mobile Army) operating in a MUST (Medical Unit Self-Contained Transportable) configuration supported by the 1st Infantry , 1st Air Cavalry, and 5th ARVN Infantry Divisions. There were 1528 admissiona; 1019 US and 509 Vietnamese (to include civilians and POWs).

During this study there were 70 deaths charged as the responsibility of the hospital and the physicians therein. Of these, 26 occurred in the emergency room and pre-operative section (E.R.), 23 occurred in the operating suite (O.R.) and 21 occurred at some point in the post-operative course (P.O.) before leaving this hospital. (Note that the average length of stay is three days.)

In the nine month period there were approximately three complete personnel changes among the professional complement. Of the total of 44 patients submitted to operation who died, eight surgeons were responsible for 38 cases. Seven of these eight were fully trained and qualified products of the present day American surgical training system.

OBJECTIVES:

This study had several objectives in mind.

(1) Does the mass casualty influx of great numbers of patients at all hours of the day and night, cared for by harried personnel of varying physical stamina, have some bearing on the patient's surviving or not?

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(2) Does the length of time between wounding and the initiation of resuscitation have a bearing on the outcome.

(3) Does the causative agent of injury have a particular bearing upon death?

(4) Of all the people treated, do some receive less than optimum care because they are not "ours"?

(5) Of those who die before we can operate, is there something wrong with our resuscitative effort or timing?

(6) Of those who die during the operation, are there factors of poor surgery or poor preparation or is it the wounding disease itself?

(7) Finally, of those who die after the operative resuscitation, are there implications of poor surgery, poor preparation, poor post-operative treatment, or is there something in the severe-wounded disease process itself that is irreversible by present day treatment?

TIME FACTOR:

It was noted that the time of admission was between 1000 and 1800 hours for 18 E.R., 14 O.R., and 14 P.O. deaths. That is 65% of the cases were admitted during normal working hours. Stated another way 34% of the deaths (24 of 70) were patients who were admitted between 2100 and 0900 the next morning. This indicates that the "Late-at-night-tired-and-sleepy" surgical team is not liable for the greater mortality.

Information obtained from the Field Medical Card and the Clinical Cover Sheet shows that the time between arrival at the hospital and time of injury was recorded in 33 of the 70 deaths. Omitting two cases (one of 24 hours and another of five hours), 31 cases were between 25 minutes and three hours getting to the emergency room. The average (mean) was 65 minutes and the median was 45 minutes.

CAUSATIVE AGENT:

The causative agent of the fatal injury was fragmentation missiles in 46 cases (16 E.R., 16 O.R., 14 P.O.); gunshot missile in 16 cases (3 E.R., 6 O.R., 7 P.O.); blunt trauma (vehicle run-over) in six cases, all of whom died in the emergency room. One Vietnamese child died following a laparotomy for a 30 hour old penetrating stick wound of the abdomen of overwhelming peritonitis, sepsis, and dehydration. Another Vietnamese child died of encephalitis in the emergency room.

Of the 1528 total admissions 66% were US and 33% were Vietnamese. Of the total operated cases (1010), 67% (678) were US and 33% (332) were Vietnamese. Of the 70 deaths 35 were Vietnamese and 35 were American - a 50-50 ratio which might give pause for reflection.

EMERGENCY ROOM PREOPERATION SECTION DEATHS:

In the emergency room-preoperative section 26 patients died. These patients are counted because a great deal of time, effort, personnel, material, and energy were expended with no tangible results. Eleven cases were "brain injury" (brain tissue extruding from the calvarium with fixed dilated pupils and no spontaneous respiration) who were treated expectantly. Four cases had "internal injuries" - presumably internal hemorrhage (e.g. vehicle run-over cases). Nine cases had exsanguination as a cause, that in spite of multiple portal whole blood and fluid infusions failed to respond. One patient died of encephalitis and another died of a cardiac wound in spite of an open thoracotomy attempt in the E. R. Studying the time between injury and arrival in the E. R. in the thirteen trauma (non-brain injury) cases, seven had the time recorded between 30 minutes and three hours with an average of 90 minutes.

OPERATING ROOM DEATHS:

Of the 23 operating room deaths, 19 had wounds involving the gastrointestinal tract, twelve had respiratory tract wounds; there were no cardiac wounds and three patients who had great vessel injury (vena cava) wounds also had other significant injury. 19 were in shock on admission and 15 were in shock on induction of anesthesia. Resuscitation time (in E. R. and pre-op.) ranged from 25 minutes to six hours with an average of 75 minutes and a median of 50 minutes. Operating time ranged from ten minutes to 355 minutes with an average of two hours and a median of 90 minutes. Whole blood usage varied from eight to 84 units with an average of 26 and a median of 21 units. A cause of death was unquestionably exsanguination in eleven cases and probably the twelfth, "shock" in nine and probably one other, "wet lung" (or some sort of respiratory problem) listed only once. It would appear that technical difficulties were a definite cause in ten cases. (Included in these are four cases of "oversewing the lung" to control hemorrhage, three cases of celiac axis bleeding, and two liver resections to control hemorrhage.)

POST - OPERATIVE DEATHS:

In the 21 cases who died after the operation, 13 had wounds involving the

gastrointestinal tract, five had respiratory tract wounds, nine had musculo-skeletal wounds, and seven had amputations. 14 were in shock on admission and ten were in shock upon induction of the anesthesia. Resuscitation time ranged from 40 minutes to 6 hours in one case (E. R. and pre-op.) with an average of two hours and a median of 80 minutes. Operating time ranged from 55 minutes to 6 1/2 hours with an average of 170 minutes and a median of 180 minutes. The time after operation until death ranged from 15 minutes to 21 days (this latter case was omitted from the statistics in the remainder of the paragraph as it was an unusual case and the only death case to be in the hospital beyond the statistical average length of stay - three days) with an average time being 33 hours and a median being 19 hours. Whole blood usage ranged from one unit to 59 units with an average 28 and a median of 29. Seven cases did not receive antibiotics. Penicillin was given to twelve, and chloromycetin, stretomycin, ampicillin, tetracycline, and kantrex were used in a few cases each. Two cases were re-operated. The first case was a patient with hepatic artery injury who was re-operated at thirteen days because of jaundice and a duodenal fistula, who later developed a stress ulcer and succumbed to probably massive pulmonary embolism on his 21st post-op day. The second patient had lower extremity wounds and developed an acute abdomen twelve hours after his original debridement and amputation and was found to have intestinal injuries secondary to overlooked fragment wound penetration from below and died 1 1/2 days later of a febrile-oozing-respiratory syndrome. The cause of death was unmistakable continued irreversible shock in seven cases, the development of a bleeding-oozing syndrome (variously named) in five, and a respiratory cause in nine. It is felt that technical operative difficulties (i. e. bleeding lung hilium, bleeding liver hilium, bleeding retro-peritoneal space) which were never adequately controlled contributed to five deaths. Six deaths had the picture of a respiratory oozing-febrile type death.

OTHER OBSERVATIONS:

Two other interesting findings evolved during the study: one dealing with the mortality of negative laparotomy and the second dealing with the mortality of lung suture.

Of the 44 cases who were brought to the operating room and died either there or post-operatively, 34 had laparotomy for internal injuries. (In the same nine month survey 226 laparotomies were done of which 40 were negative - 17%). The operative mortality of all laparotomies was

15%; of the positive laps 14%. The mortality of the negative lap was 0.8%. One of these two cases actually did have a blast ecchymosis of the bowel and mesentery, but died 21 hours post-operatively after 57 units of whole blood from prolonged shock with bilateral A/K amputation wounds.

39 Thoracotomies were done in the nine months. Omitting those performed for abdominal surgery or cardiac massage, 25 were performed specifically to correct some intra-pleural trauma. Of these, eight died for an operative mortality of 32%.

EVALUATION:

Because the majority of admissions, treated patients, and deaths occurred during the so-called "working hours" there is no indication that patients were lost because of the time of day as an indicator of the availability of personnel and their ability to work.

In the cases where listed (50%)* the time between wounding and the beginning of treatment is about an hour. This would seem to be a little longer than the usual "few minutes" that one has been led to believe is the case with helicopter evacuations.

Blunt trauma (vehicle run-overs or crush) cases have the worst prognosis; none survived beyond the emergency room. Fragmentation wounds were 3:1 more frequent than gunshot wounds. However, both kinds died in about equal proportions (33%) in each area.

More Vietnamese died in proportion to the number admitted than did Americans. This study does not give any clear indication as to why this is so.

Of those patients who died before being operated upon (who were "operable") it seems that some died of pure and simple hypovolemic shock. A knowledge of these cases individually indicates that tactical considerations in the field often preclude resuscitation. For example, a gunshot wound of the left femoral artery, if it had occurred in an NDP where quick tourniquet and I. V. fluid and splinting could have been done almost immediately, would result in an otherwise unremarkable outcome. However, the same wound in the distant rice paddies under grazing fire with the soldier relatively alone, he could almost bleed out before anyone could tourniquet the leg and by the time he arrived at the emergency room the situation of an irreversible shock picture would be present.

* See Editor's Note

In the operated cases, resuscitation time on the average seems both "long enough and yet not too long" - an hour approximately. It would seem that the surgeons are being neither too hasty nor are they piddling along (1 1/2 to 2 hours operating time). As is suspected, the more blood used the greater the chances of a poorer outcome. It is apparent that the major problem with death in the operating room is "shock", either at the beginning of the procedure (from inability to resuscitate) and continuing through the procedure, or shock developing from continued hemorrhage that is uncontrollable because of technical ability or the wounding process.

In the patients dying post-operatively it would appear that a longer period of time on the average has been spent in resuscitation and a longer time spent in operating on the patient. This may indicate that the patients who die in the operating room have such serious wounds that resuscitation is "hurried up" or cut off in order to get the patient into surgery and that the wounds are so severe that the patient dies before a "complete" operation can be done.

There is definitely a respiratory-type death that occurs only in the post-op group of patients, with or without a bleeding-oozing syndrome.

Finally, it was of interest to note that a negative laparotomy had no bearing upon mortality and that thoracotomy at this hospital has had a very high mortality in the past.

CONCLUSION:

In conclusion it is apparent that there are some traumatic problems that are absolutely fatal, given the present state of the art and science of medicine. There are other traumatic problems that develop follow-up difficulties because of the nature of the resuscitation (e.g. "overtransfusion" with "older", "non-matched", "cold" blood). There are some traumatic problems where a better outcome can be achieved by improving our technical and scientific skill and capability.

SUMMARY:

70 deaths occurring in a nine month period at a forward surgical hospital have been studied and observations recorded as to factors that might have a bearing on these fatalities and lessons learned.

Editor's Note

The author is to be commended on his objectivity. It would be most informative if we could gather similar information at each hospital, but like so many other things it requires time and additional effort sparked by intellectual curiosity.

The time lapses between wounding and treatment is least likely to be known or recorded in the non-US casualty. It is generally concluded that there is delay and it is one one of the factors in increased non-US mortality. Obviously, this information would provide valuable information for future studies of this type and should be recorded.

The 32% mortality for thoracotomies is higher than expected but may be due in part to the practice of operating only on a complicated or severe chest injury. (See the paper on pulmonary resection for pulmonary high velocity wounds in this issue for further observations.)

James P. Geiger

Maturity is the ability to harness your abilities and your energies and do more than is expected. The mature person refuses to settle for mediocrity. He would rather aim high and miss the mark than aim low -- and make it.

HOSPITAL ACQUIRED INFECTION - WHO'S TO BLAME?

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ROBERT L. DILLARD, CPT, MSC*

Did you, as a member of a medical team, physician, nurse, technician, ward attendant, or administrator, ever think that the infection the patient has may be due to your oversight or carelessness? O.K, calm down and put your indignation back in your pocket. STOP AND THINK for it may be true, unfortunately. Many patients come to our hospitals pretty badly wounded and with badly contaminated wounds, but they have youth and strong constitutions in their favor. For example, the casualty might have been out playing a fast game of basketball or on a long patrol just before he was wounded, neither of which a sick person could tolerate. Following surgery, his wound is healing nicely but, infortunately, he is not yet on the way to rapid recovery. WHY? Because you may have unintentionally overlooked a reservoir of infection or inadvertantly carried resistant bacteria from one patient to another.

Try to pinpoint the problem and perhaps come up with a solution. A bacteriology survey was conducted at one of our hospitals here in Vietnam. The results were noteworthy and should give us all food for thought. The accompnaying table gives a brief summary of the results obtained by the laboratory and is used primarily to dramatically illustrate the latent sources of infection in our hospitals and clinics.

Upper respiratory infections have been high on the list of complications. A careful study of case histories indicated inhalation therapy equipment may be one of the culprits. Mouthpieces for positive breathing machines were monitored and found to have klebsiella, staphylococcus, and bacilli present. Serratia specie was isolated from surgical soap. The organism can and often does produce a fatal infection despite its prevailing classification as a harmless saprophyte. During the past year there were 27 isolates from pathogenic cases identified from patients who were on oxygen therapy. One suggestion would be to frequently change soap and other solutions used for sanitary and cleaning purposes. Such solutions frequently lose their potency over extended time periods and with repeated usage. The Emmerson respirators also had their share of contaminating Staphylococcus aureus and Klebsiella sp.

* Bacteriologists, 9th Med Lab, Long Binh, RVN

The ward can be the source of infections found in convalescent patients. Once again, the main organisms found were those which have been creating problems, namely: Staphylococcus aureus, Pseudomonas aeruginosa, and Klebsiella spp. Most of the isolates were obtained from pieces of equipment that are handled frequently by ward personnel such as tray tops, bed rails, sink tops, hemostats, sponge containers, and charts. Air exposure plates placed at three levels for five minutes did not yield a significant number of colonies. The presence of Staphylococcus aureus does indicate the need for greater vigilance in sanitary practices to further reduce the number of organisms present. The operating room is always a potential source of infection for the surgical patient, and as such requires special attention by all personnel. Proper and regular cleaning are essential. Proper O. R. protocol, such as wearing scrub suits and shoes only in the operating room suite, must be observed. Trays, lamps, sponge cans, etc. are routinely handled by circulating personnel and were found to be grossly contaminated on the outside. The exterior of I. V. fluid bottles such as saline, glucose, and antibiotics were also in the same condition and represent a potential source of infection.

VIGILANCE AND GOOD HOUSEKEEPING, ANYONE?

Editorial comment:

This study identifies a major problem in the care of our patients in Vietnam. Hospital facilities, with one exception, are temporary structures. While this represents an advance over tentage in that it reduces the dust problem, it probably increases the problems related to hospital-acquired infections and resistant organisms.

Most of these buildings are Quonset type constructions with a window unit type of air conditioning in O. R. s and some wards. Introduction of a ducted system has begun but dust, flies, wooden shelving, concrete or asphalt floors, etc. present problems faced by no US facility. The casualty is commonly stripped on arrival to facilitate the search for wounds, resuscitation, and removal of dirt and debris. Many wounds contain residual debris and vegetation as they are debrided in the O. R. and contamination of facilities is continuous.

In spite of the bacteriological evidence recorded I must state that personnel are not slipshod, nor do they willfully disregard accepted hospital procedures. However, increased attention to details of care, improved housekeeping, and identification and elimination of reservoirs of infection must be a part of our daily effort if we are to improve patient care. Poor techniques cannot be countered by antibiotics.

James P. Geiger

Source	Organism Isolated
	Inhilation Therapy
1. Surgical Soap	Bacillus sp., Pseudomonas aeruginosa
2. Nebulizer	Serratia sp.
3. Bennett Respirator	Klebsiella sp.
4. 688-781 Emmerson	Staphylococcus epidermidis, Bacillus sp
5. 688-149 Emmerson	Staphylococcus aureus, Staphylococcus epidermidis, Bacillus sp.
6-17.	Staphylococcus epidermidis
	No Growth
	Ward I
18. Instrument tray (top)	Staphylococcus aureus, Klebsiells, Escherichia coli, Pseudomonas aeruginosa
19. Bed Side Rail	Klebsiella, Staphylococcus aeruginosa
20. Sink (top)	Pseudomonas aeruginosa.
21-22.	No Growth
	23 - 30 OR #2
23. Sink (top)	Proteus mirabilis, Staphylococcus aureus, Escherichia coli, Bacillus sp, Pseudomonas aeruginosa
24. Table (top)	No Growth
25. Floor	Klebsiella, Bacillus sp., Staphylococcus aureus
26. Anesthesia tubing	Bacillus sp., Staphylococcus epidermidis, Klebsiella, Proteus morganii
27. Lamp Surgical	Bacillus sp., Klebsiella sp, Escherichia coli.
28. Bench	Klebsiella sp., Bacillus sp.
29. Tray (top)	Bacillus sp., Staphylococcus epidermidis
30. Bottles (ouside)	Psuedomonas aeruginosa, Bacillus sp.
	31 - 34 OR #1
31. Ringers for injection bottles (outside)	Staphylococcus aureus, Bacillus sp.
	Escherichia coli

32.	Vacuum pump tubing	Staphylococcus aureus, Klebsiella sp.
33.	Bottle stand for injection	No Growth
34.	X-Ray viewer	Proteus morganii, Klebsiells sp., Staphylococcus aureus

35 - 41 Ward #2

35.	Bed side rail	Klebsiella sp., Staphylococcus epidermidis
36.	Bedside table (top)	Klebsiella sp., Staphylococcus aureus, Bacillus sp.
37.	O_2 Tank (regulator)	Bacillus sp., Klebsiella sp., Staphylococcus epidermidis
38.	Surgical Soap	No Growth
39.	Rinse for soap solution	Staphylococcus aureus, Proteus sp., Klebsiella sp.
40.	Instrument cart	Bacillus sp., Klebsiella sp., Staphylococcus aureus
41	Hemostat	Proteus mirabilis, Klebsiella sp., Staphylococcus aureus

42 - 46 Ward #3

42.	Sponge container (top)	Bacillus sp., Escherichia coli, Klebsiella sp., Staphylococcus aureus
43.	Bed pans	Bacillus sp., Staphylococcus aureus, Pseudomonas aeruginosa
44.	Stethescope	No Growth
45.	Bennett in use (tubing)	Pseudomonas aeruginosa, Bacillus sp.
46.	Charts for patients	Staphylococcus aureus, Pseudomonas aeruginosa, Bacillus sp.

Exposed to Air 5 Minutes

Plates (numbers)	Organisms	Number/plate
	OR #2	
1.	Bacillus sp.	Less than 10
2.	"	"
3.	"	"
	OR #2	
1.	Bacillus sp.	"
2.	Bacillus spp.	
	Staphylococcus epidermidis	"
3.	Bacillus sp.	"

Plates (numbers)	Organisms	Number/plate
	WARD #2	
1.	Staphylococcus aureus	Less than 10
2.	Staphylococcus aureus, Bacillus sp.	"
3.	No Growth	
	WARD #1	
1.	Staphylococcus epidermidis	Less than 10
2.	No Growth	
3.	"	

Maturity is the ability to live up to your responsibilities, and this means being dependable. It means keeping your word. And dependability equates with personal integrity. Do you mean what you say -- and say what you mean?

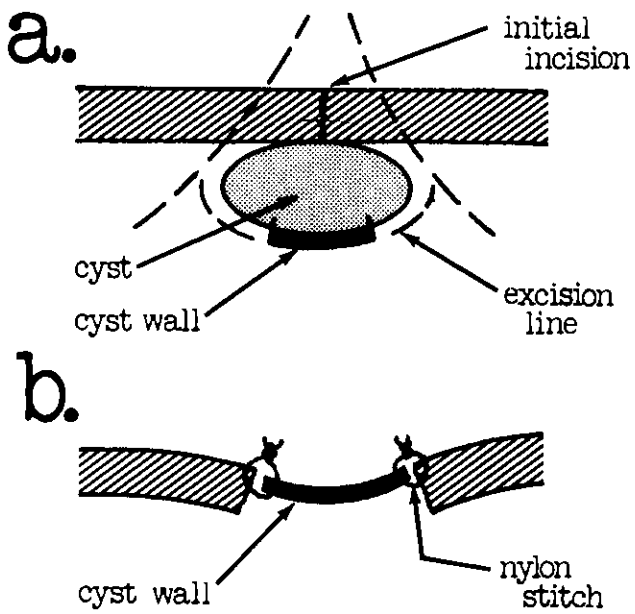
The world is filled with people who can't be counted on. People who never seem to come through in the clutches. People who break promises and substitute alibis for performance. They show up late -- or not at all. They are confused and disorganized. Their lives are a chaotic maze of unfinished business.

THE PILONIDAL SINUS
(A Foolproof Method of Treatment)

JAMES P. GEIGER, COL, MC*

Historically, the infected pilonidal sinus or cyst has been a major problem for the Army. The prevelance of the disease as well as the protracted healing period and propensity to recurrence was responsible for over four million man days lost from duty during World War II. (1) These guidlines for tretament are offered since infected pilonidal sinuses remain a significant problem in Vietnam.

I will not enter into a lengthy discussion on the merit of various etiologic theories, but there undoubtedly is a congenital basis for some cases. Based on a controlled study conducted at West Point from 1960-64 it can also be stated unequivically that pilonidal sinuses are acquired. (2)



I have seen or personally performed every conceivable procedure for this problem from total excision and silver nitrate cautery with healing by secondary intention to excision with primary closure or split thickness skin grafting. Since 1955 I have been absolutely convinced that the only way to definitively treat the pilonidal sinus is by the Abramson modified marsupialization technique. (3)

If the operative procedure is performed as described and the post-operative care is conscientously followed, healing is almost certain in 14-21 days and there is negligible chance for recurrence. The technique is simple, safe, is applicable to recurrent disease, does not require general or spinal anesthesia, and in a favorable environment can be carried out as an out-patient procedure

* Surgical Consultant, HQ, USARV Surgeon's Office, Long Binh, RVN.

This is in marked contrast to the 60-90 days required for healing when the sinus is excised and allowed to heal secondarily.

TECHNIQUE:

1. Preoperative: light sedation of choice (anti-histamine will suffice).

2. Anesthesia: local and regional field block with 1% xylocaine with epinephrine (20-30cc average).

3. Procedure: a. Open tract by incising skin and sinus over grooved director or mosquito clamp in sinus tract.

   b. Open entire length of sinus and remove hair and debris with gauze.

   c. Search for and open lateral branches or satellite simuses.

   d. Circumcise (excise) the skin edges and undercut slightly to facilitate closure.

   e. Excise all of the sinus tract and scar except a 1/4 to 3/8 inch wide central strip at the base and along the lateral extensions if present.

   f. Skin edge is sutured to the margin of the remaining sinus strip with simple or vertical mattress stiches of 2-0 or 3-0 monofilament nylon (4 or 5 knots and long ends for easy removal). If the tract is friable the entire sinus is excised and skin edges are sewn to sacral fascia. Apply snug compression "hemorrhoid type" of dressing.

4. Post-operative Care: a. Minimal activity and mild analgesics for the first 24 hours.

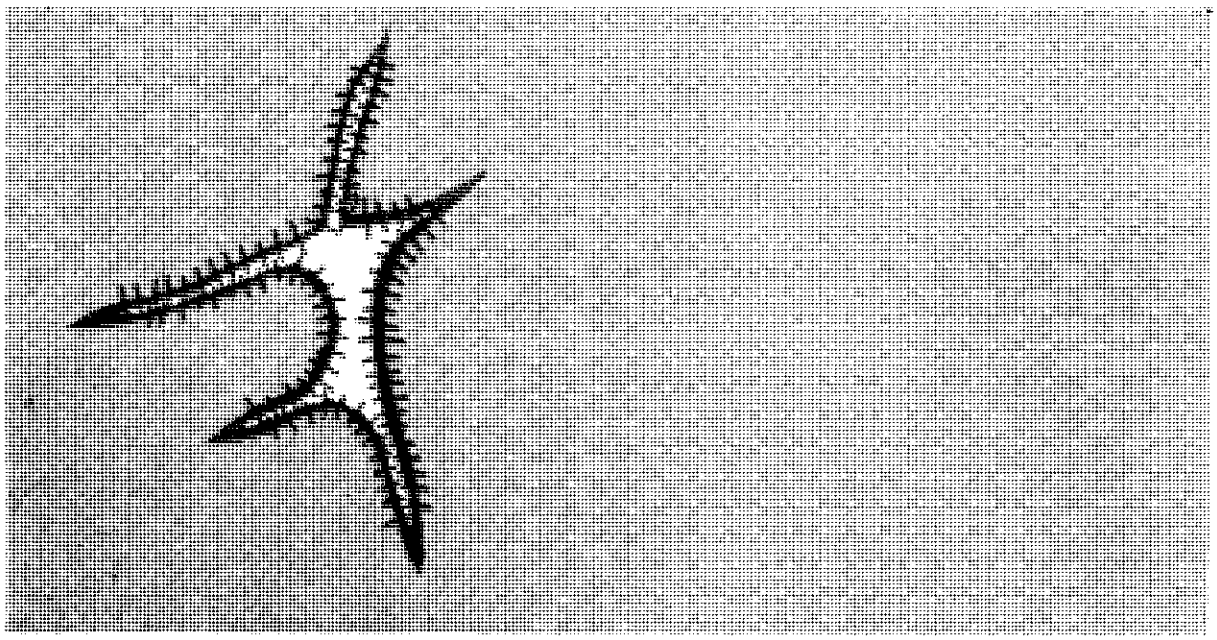
   b. P.O. day #2 - change dressing and cleanse wound with peroxide and merthiolate or 20% mercurochrome two times daily.

   c. Start b.i.d. sitz baths on third to fifth day.

   d. Remove sutures 7 - 10 days.

   e. Shave area at least every seven days.

   f. Continue wound cleansing (as in b.) every third day to prevent premature healing or bridging.



COMPLETED MARSUPIALIZATION

g. As healing advances showers can be substituted for sitz baths. A "buddy" or corpsman cleanses the area with swabs of peroxide and merthiolate or mercuochrome daily.

After healing hirsute individuals should have the area shaved weekly or use a depilatory (Surgex, surgical depilatory, 100 Gm FSN 6505-926-8987). Follwoing initial post-operative care the patient should be sent to the 6th Convalescent Center. Garrison troops can go back to their unit if appropriate arrangements are made for the remainder of their care. Field troops do not have facilities to provide adequate care during healing.

This procedure is applicable to all patients except those with severely inflamed pilonidals. In such cases incision and drainage sre performed followed by soaks. Marsupialization is performed when the cyst is quiescent if there is a history of one or more previous acute episodes.

(1) Casberg, M. A., Bul US Army M. Dept, 9:439, June 1949

(2) Geiger, J. P., Green, D., unpublished data

(3) Abramson, D. J., Ann Surg. 139: 341 March 1954
151 261 February 1960

INITIAL CARE OF EXTREMITY WOUNDS IN WAR SURGERY

GEORGE POMERANTZ, LTC, MC*

The demands for adequate debridement of the extremities made by modern warfare require a bold approach during initial surgery for combat wounds.

Prior to surgery, the extremities must be thoroughly evaluated in regard to fracture, joint injury, vessel and nerve status, and major tendon injury. Pulses and capillary filling can be rapidly evaluated. Gross neuromuscular exam can be tested in the conscious patient. Accurate entries on the patient's record are extremely helpful when planning later reconstructive approaches.

Adequate splinting and protection of the wounds with sterile dressings is important throughout the preoperative period. A fractured extremity must be carefully splinted and handled with care in surgery during that time when attention is directed on injury in other systems (i. e. head, abdomen, etc.).

The surgeon must direct his attention to the preparation of the extremity in surgery. Circumferential shaving and surgical preparation of the entire extremity is necessary. The nails must be cleaned as completely as possible. This latter task can often be accomplished in the preoperative area prior to anesthesia.

Whenever possible the use of a tourniquet will facilitate debridement. It can be released prior to dressing to insure adequate hemostasis.

The purpose of the incision made into the extremity is the first and most important surgical procedure performed in war surgery, the results of which will determine what tissues remain for later wound closure and reconstruction. The goals of debridement are twofold:

I. Provide for the release of tension from hematoma and later swelling.

II. Remove devitalized muscle, foreign material that is readily accessable and any other tissue that can't be used by the body.

The first goal is best achieved by the use of an extensile exposure, that respects known principles of skin lines and the need to prevent joint contracture. This incision must be coupled with appropriately deep fascio-

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tomy when muscle tissue of the deep compartments are involved or when a high velocity missile tract extends through these areas. Swelling in the deep compartments of the extremity, particularly the forearm, calf, and foot are notorious for resulting in ischemic death of tissue and marked secondary loss of function. Circular or cone debridement is dangerous and ineffective. In most wounds only a few millimeters of skin that are non-viable require excision

The second goal of the surgeon performing debridement is removal of all dead fat, fascia, and muscle. With adequate exposure through an extensile incision, muscle bellies can be well visualized without excessive retraction. All muscle that is shredded, obviously necrotic, shows discoloration, loss of consistancy and turgor, or fails to contract or bleed, should be excised.

Every effort must be made to incise along the entire wound tract to insure exposure to all areas of the wound and insure removal of all devitalized tissue. When injured nerves are visualized during the debridement, they may be tagged with wire sutures. Accurate entries must be included in the patient's record stating the nature of the injury and the measured extent of the gap. This is a most helpful guide in planning later repair or reconstructive procedures.

The surgeon must make every effort to save all bones. Certainly any major segments of the long bone must be left in the anatomic position if at all possible. In the event that the wound goes on to heal without complication, this bone will be incorporated into the fracture callous resulting in a healed functional extremity. Large defects in the long bones require prolonged efforts at reconstruction. Amputation may be the result if the defect is insurmountable.

The operation is not completed until the dressing is applied. This must be supervised or applied by the surgeon personally in all cases. Bulky dressing must be carefully applied to allow for some slight compression of the wound. The dressing gains compression from the bulk of material used and not by the force of constriction on the wound area. A base of fine mesh will encourage firm granulation tissue and enhance removal; then fluffs of 4x8s and finally the bulk provided by large ABD dressings. This dressing must extend from the toes or fingers to the proximal extremity. Care must be taken to put fine mesh between the fingers or toes to prevent interdiginous maceration.

Proper position of joints is necessary so that function of the extremity can easily result. These so-called "functional positions" are well known to most surgeons. But to review, the hand should be grasping a ball with the thumb in opposition to the fingers and the thumb web preserved. The foot should be at right angles to the leg with the foot in a very slight pronation. When the knee joint is injured, the knee should be positioned in extension to prevent flexion contracture and to allow for isometric quadriceps rehabilitation.

Splints must be sturdy and well padded. Casts carefully applied with attention to position, trimming for comfort, and padding to protect the heel and other bony prominences. Casts must be bivalved or monovalved if the patient is to be transported in the early post-operative period.

CONCLUSION Certain basic principles of preoperative evaluation and initial wound care of the injured extremity have been reviewed. Adequate debridement is achieved through extensive exposure, fasciotomy to the deep compartments of the extremity where indicated, and careful removal of all devitalized tissue. Attention to these details coupled with frequent review of the anatomy of extremities will insure successful initial results and enhance functional restoration of the injured part.

Editor's Note

Copius irrigation is essential to reduce the degree of contamination and remove minute debris and necrotic remnants. Additional comments on orthopedic management were published in the USARV Bulletin, Number 40-18, November-December, 1969, pp. 9-14.

See the following article for an example of an excellent extremity dress- Casts should be marked with the appropriate fracture diagram, date of injury, and date of D. P. C.

James P. Geiger

WAR WOUND DRESSINGS FOR EXTREMITIES

THOMAS WITSCHI, LTC, MC*

The extensive debridement of wounds caused by multiple fragments or high velocity missiles leaves many war injured patients with exposed fractures and large skin and soft tissue defects and their surgeon with the problem of suitable dressings. Circular plaster, with or without dressings is potentially hazardous because of swelling, requires splitting and close post-operative observation often not feasible for the busy combat surgeon or not available to the patient during all phases of his air evacuation to PACOM or CONUS. Sudden hemorrhage under a cast can be a disaster if equipment is not available to remove the cast. On the other hand, a simple posterior splint is often not adequate stabilization for a comminuted fracture and maintenance of the proper position of the foot and ankle.

The purpose of this paper is to describe a technique of dressing and splints for war wounds of the extremities which:

1. Stabilizes fractures and splints injured soft tissue to minimize further tissue damage and edema formation.

2. Absorbs drainage from wounds without the dressings becoming soaked through to the external surface.

3. Provides maximum comfort for the patient on the air evacuation chain.

4. Is easy to apply and is applicable to almost all extremity cases.

5. Requires no splitting and minimal post-operative observation for circulatory embarassment.

A standardized arm dressing pack and separate leg dressing pack are maintained by CMS and only one package need be opened by the surgical nurse for a given case. Plaster splints are also prepared in advance and no special personnel are required for their application.

A bulky dressing of fine mesh gauze, 4x8s, ABD pads, and kerlex is applied to the arm or the leg and the plaster posterior and "stirrup" splints are molded to the dressing with Brown roll or krimtex. The stirrup provides rigidity and maintains the position of the foot and knee without en-

* Chief of Orthopedics, 3d Field Hospital, Saigon, RVN.

Figure 1

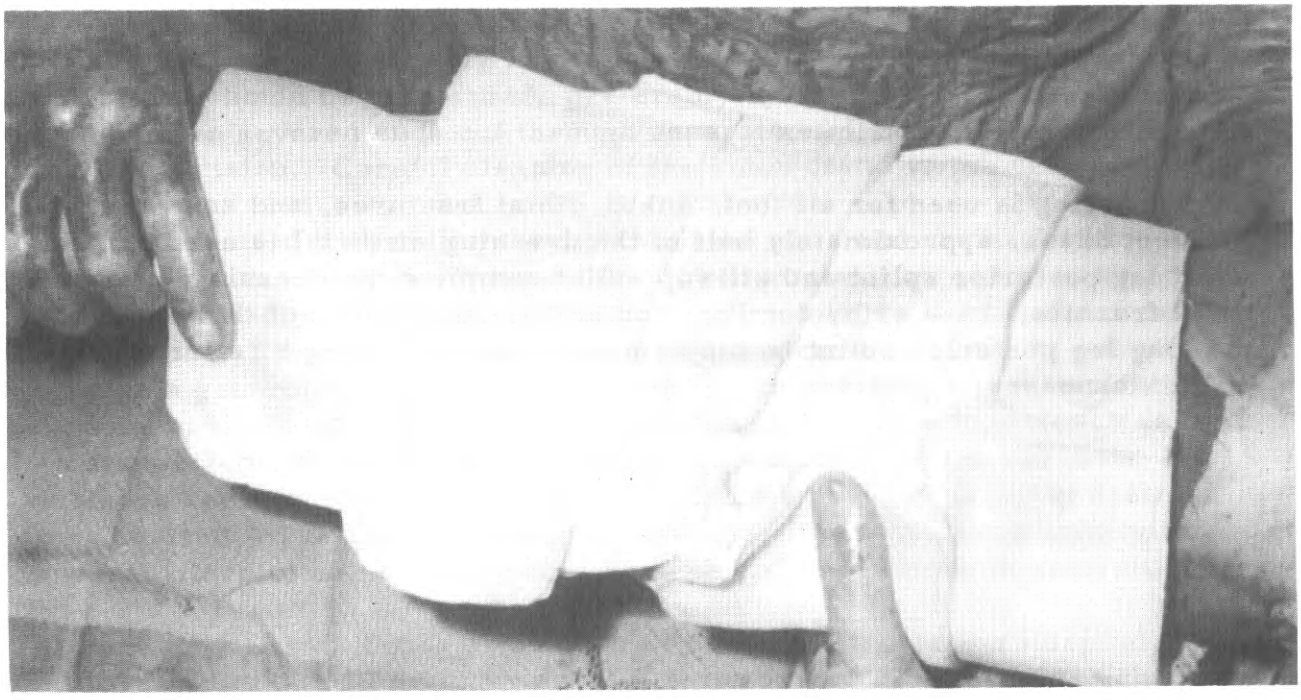

Figure 2

Figure 3

Figure 4

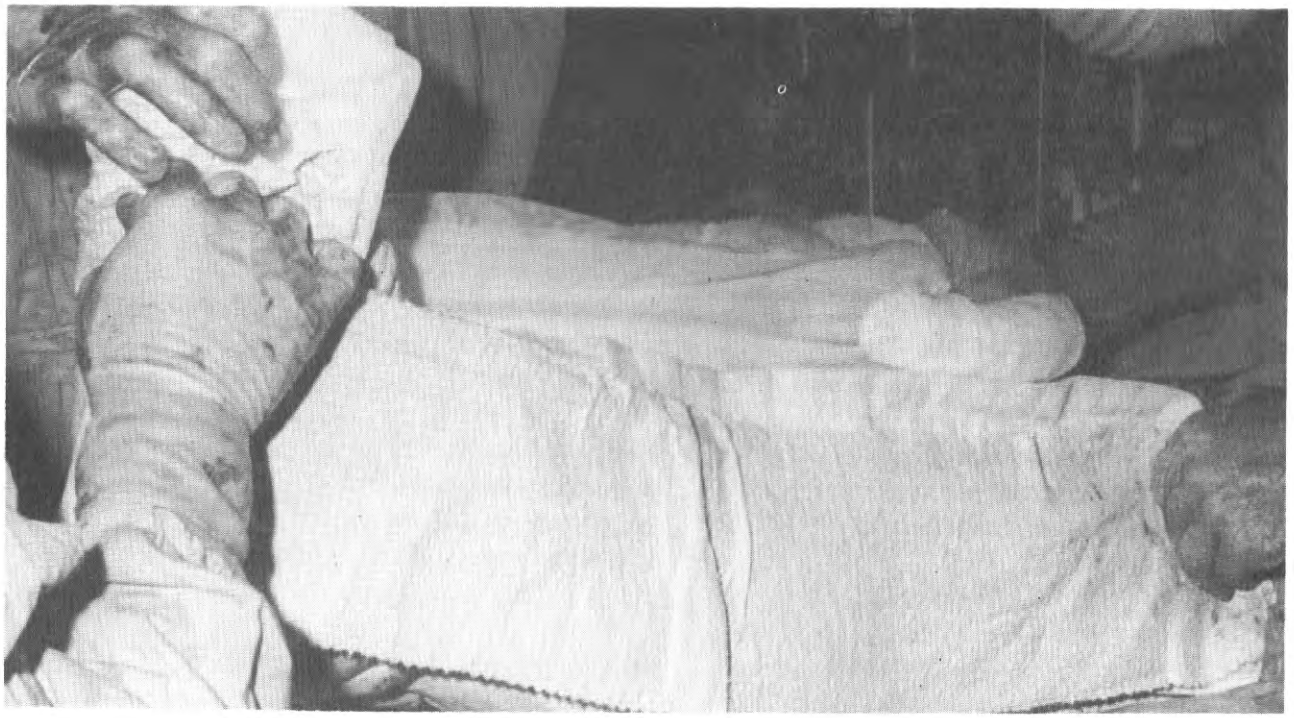

Figure 5

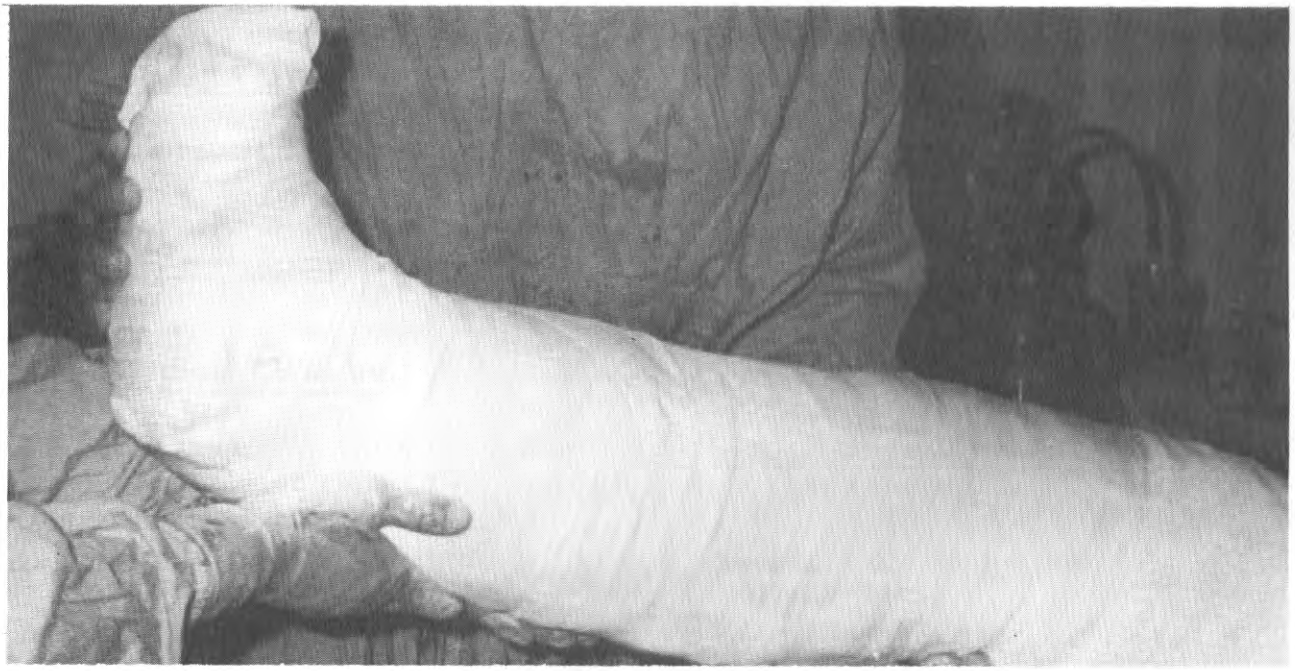

Figure 6

MANAGEMENT OF ACUTE LARYNGOTRACHEAL TRAUMA

LEE H. MILLER, LTC, MC*

In the past two years we have had the opportunity to evaluate and treat over thirty cases of trauma to the larynx and trachea. All of these patients received some initial treatment in Vietnam either by otolaryngologists or general surgeons. Follow-up is now available on fifteen of these cases.

Articles on the subject have become more frequent in the ENT literature in recent years as traffic accidents take their ever increasing toll. If the unfortunate sequellae of laryngeal or tracheal stenosis with permanent tracheostomy and a poor or non-existent voice are to be avoided, then prompt and judicious treatment of this injury by specialists is mandatory.

In civilian type injury the traumatic agent is usually blunt as in the case of the dashboard. The natural flexibility of the laryngeal structures helps in its protection. In this series, however, all the wounds were inflicted by high or medium velocity missiles, either fragments of metal in the majority or bullets in the remainder of the cases.

The resiliant suspension of the larynx can be grasped by reviewing the anatomy of the larynx and the adjacent musculature (strap muscles and pharyngeal constrictors) and the cartilages themselves with their interposed membranes, The inferior cornu of the thyroid cartilage articulates with the cricoid which is its only direct articulation. It's relationship with other structures are all maintained by muscles and ligaments. Severe blunt trauma as with a steering wheel or dashboard will result in compression of these structures against the cervical vertebral bodies with fracture of the larynx and soft tissue disruption.

High velocity missiles will cause varying degrees of trauma from very minimal pathology such as a mucosal tear visible on laryngoscopy to severe destruction as illustrated in the following cases. One well placed gunshot wound took seven cm. of cervical trachea and a portion of the anterior cricoid in a patient who survived this insult but who later succumbed following attempted reconstruction of the defect. As in other injuries, the degree of trauma to the larynx and trachea varies directly with the size of the missile and its velocity at the time of impact.

* Chief, ENT Service, 249th General Hospital, Camp Drake, Japan.

Symptoms and signs of trauma to the upper air way are variable. The most constant symptoms are dysphonia, ranging from mild hoarseness to aphonia, cough (often with hemoptysis), and dyspnea. There may be dysphagia, and stridor may be present in severe injuries. A gunshot wound will be evident, but a small fragment may have penetrated with little external evidence. Subcutaneous emphysema is frequently present as air dissects in the subcutaneous tissue plane. Gross fractures of the larynx may be palpable.

Indirect examination of the larynx should be performed if this is feasible. A good appreciation of the degree of trauma can be obtained and cord mobility must be ascertained. Radiographic examination is very useful and even plain films may be quite demonstrative. Tomographic studies give a good deal of information showing the laryngotracheal air shadow, the false and true cords, the laryngeal ventricles and the subglottic area. Contrast studies give added detail but are not well tolerated by the wound patient. Direct examination of the larynx may be needed in certain cases and always preceded an open exploration. [1]

The aim of treatment here has been to restore and maintain an adequate air way and provide a functionally acceptable voice. It is distressing indeed to receive a patient with a statement such as this on his transfer summary: "Both vocal cords were destroyed and the larynx was closed in layers. The patient was advised of the need of a permanent tracheostomy." These patients often have a repairable injury and ultimately return to duty with a good voice and air way.

In the case of minor hematomas or lacerations with minimal compromise of the air way, the patient should be treated conservatively with close observation, humidification, broad-spectrum antibiotics, and facilities for intubation and tracheotomy on hand. If cartilaginious fractures are palpable and laryngoscopy reveals extensive mucosal lacerations, the larynx must be explored if the complex problems of chronic stenosis are to be avoided. If there is uncertainty about the exact nature of the injury, it is probably wiser to explore. Mucosal lacerations are approximated with fine chromic material, the endolarynx having been exposed through the wound itself with or without a laryngofissure. If the cartilaginious skeleton is fractured and unstable or if there are circumfirential lacerations, a stent must be placed in order to maintain support for an adequate air way. Various materials are available for this and I have

[1] Ed: Endotracheal intubation may be contraindicated or impossible and immediate tracheostomy essential to survival.

been using one that is readily available and which has yielded satisfactory results. It consists of a finger-cot containing modeled foam rubber to give a triangular cross-section similar to that of a glottic chink. This is inserted into the laryngeal inlet and brought down into the subglottal area. It is free superiorly in the hypopharynx presented below the tip of the epiglottis. It is secured into position using 24 guage stainless steel wire which is passed through 18g spinal needles above and below the level of the cords and brought out laterally over booties. If loss of mucosa is extensive, an STSG from the thigh can be placed around the stent. Fractured segments of thyroid cartilage are approximated and sutured with fine wire. Occasionally a defect will be present but adjacent soft tissue can be brought over this area and healing will occur. More anatomically shaped acrylic splints are available commercially. These stents should be left in place for six to eight weeks. The use of tubes with a circular cross-section such as chest tubes is not so good. If these tubes are not occluded, the patient will aspirate through them.* Also, an anterior web will develop at the commisure of the cords.

Results: Of the fifteen cases for which follow-up from a CONUS hospital is available, all were able to shed their tracheotomy tubes and all spoke with varying degrees of proficiency. Some of the severe injuries will have permanent hoarseness. Others have necessitate further procedures such as Teflon injection of a paralyzed cord to add bulk to it so that contact with the other cord will be possible. Others have undergone resection of a residual anterior web with ultimate good result. The severe avulsive injury to the cervical trachea was treated by freeing up the thoracic trachea and establishing an end to end anastomosis with the cricoid remnant. However, five days post-operatively, the patient exsanguinated secondary to erosion of the innominate artery.

In summary, the experience of two years of observation and active treatment of injuries to the larynx and trachea is reviewed. Early recognition of the extent of trauma is extremely important. Treatment may be conservative with close observation and supportive measures or through surgical exploration with repair of laryngeal structures and appropriate splenting as indicated. In this manner the unfortunate sequellae of chronic stenosis of the larynx and trachea can be avoided and rehabilitation of the voice and air way can, to a certain degree, be achieved.

Editor's Note

*A well placed mattress suture in the tube will provide a more anatomical configuration. In addition the tube can be occluded by sewing a narrow band of rubber tubing near one end and autoclaving for a few minutes. When all is said and done, the finger-cot is hard to beat.

NEW ARRIVALS IN-COUNTRY

NAME	GRADE & BRANCH	ARRIVED	ASSIGNED TO
Adams, Louis W.	CPT/MC	6 Jan 70	164th Avn Gp
Adduci, Maureen T	2LT/ANC	7 Jan 70	91st Evac Hosp
Ahlers, Bryson V.	CPT/MC	29 Nov 69	68th Med Gp
Ahlquist, Paul F.	CPT/MSC	31 Dec 69	4th Inf Div
Akkerson, Alfred A.	CPT/MC	21 Dec 69	43d Med Gp
Albary, Antonio V.	CPT/MC	5 Jan 70	93d Evac Hosp
Alex, Robert J.	MAJ/MSC	5 Jan 70	3d Field Hosp
Allegrini, John D.	1LT/MSC	13 Jan 70	25th Inf Div
Anderson, Robert F.	2LT/MSC	16 Feb 70	25th Inf Div
Antonicci, Anna E.	LTC/ANC	17 Nov 69	3d Field Hosp
Armbruster, Jerome L.	CPT/MC	5 Jan 70	17th Avn Gp
Arnold, Phillip G.	CPT/MC	31 Jan 70	45th Surg Hosp
Banner, Louis E.	CPT/MSC	23 Dec 69	1st Cav Div
Barnacle, John C.	CPT/MC	2 Dec 69	1st Inf Div
Barton, June M.	MAJ/ANC	25 Jan 70	24th Evac Hosp
Beal, Joseph J.	1LT/MSC	16 Nov 69	20th Prv Med
Beers, Richard P.	1LT/ANC	14 Feb 70	24th Evac Hosp
Begg, Irene	CPT/AMSC	2 Jan 70	3d Field Hosp
Beman, Charles E.	MAJ/MSC	21 Nov 69	32d Med Depot
Bennett, Dennis H.	2LT/ANC	16 Nov 69	24th Evac Hosp
Bernstein, Daniel	CPT/MC	4 Dec 69	25th Inf Div
Berquist, Robert B.	CPT/MSC	15 Dec 69	67th Med Gp
Berson, Deane S.	CPT/MC	16 Feb 70	1st Cav Div
Beson, James L.	1LT/MSC	30 Nov 69	68th Med Gp
Biddle, Michael J.	2LT/MSC	12 Dec 69	1st Cav Div
Biel, Karen A.	1LT/ANC	8 Dec 69	93d Evac Hosp
Black, Curtis J.	CPT/MC	29 Nov 69	43d Med Gp
Blazy, Jo Ann	1LT/ANC	21 Nov 69	3d Field Hosp
Boaz, M. Sidney	MAJ/MC	20 Dec 69	68th Med Gp
Bogart, Marc D.	CPT/DC	5 Dec 69	1st Inf Div
Boggard, Francis H.	LTC/MC	17 Nov 69	91st Evac Hosp
Borman, Barbara J	CPT/ANC	28 Jan 70	12th Evac Hosp
Boxhill, Carlton	CPT/MC	6 Jan 70	12th Avn Gp
Boyer, Edward G.	CPT/MC	27 Nov 69	23d Inf Div
Bozarth, Virginia J.	2LT/ANC	5 Jan 70	3d Field Hosp
Bradford, John S.	2LT/MSC	11 Dec 69	1st Bde/5th Inf Div
Breeden, Richard K.	2LT/MSC	11 Dec 69	4th Inf Div
Brewer, Dennis A.	CPT/VC	29 Jan 70	4th Med Det
Brian, Roy A. Jr.	1LT/MSC	5 Jan 70	67th Evac Hosp
Bromby, Sara L.	1LT/ANC	19 Feb 70	91st Evac Hosp

NAME	GRADE & BRANCH	ARRIVED	ASSIGNED TO
Brown, Auby L. Jr	2LT/MSC	7 Feb 70	67th Med Gp
Brown, Marie G.	CPT/ANC	27 Nov 69	566th Med Co
Brownlow, Margaret E.	MAJ/ANC	22 Nov 69	71st Evac Hosp
Bruce, David L.	CPT/MSC	7 Dec 69	93d Evac Hosp
Bruno, Francis C.	CPT/MC	6 Jan 70	20th Prv Med
Bull, John M.	1LT/MSC	7 Dec 69	12th Avh Gp
Burden, Charles G. III	1LT, MSC	7 Dec 69	68th Med Gp
Burk, William J.	CPT/MC	10 Feb 70	164th Cbt Avn Gp
Burke, Charles R.	CPT/MC	3 Dec 69	93d Evac Hosp
Burke, Timothy T.	2LT/MSC	31 Dec 69	101st Abn Div
Burnett, Corrine	CPT/ANC	31 Dec 69	11th ACR
Burns, James G.	CPT/MC	6 Jan 70	93d Evac Hosp
Burns, John T.	CPT/MC	2 Dec 60	164th Avn Gp
Burrows, Angelica E.	1LT/ANC	18 Feb 70	25th Inf Div
Butkiewicz, Edward J.	MAJ/ANC	25 Jan 70	3d Surg Hosp
Butler, Thomas M.	2LT/MSC	10 Feb 70	91st Evac Hosp
Byrd, Wilbur M.	CPT/MSC	5 Jan 70	616th Med Co
			23d Arty Gp
Calvin, Richard E.	CPT/MC	13 Feb 70	12th Evac Hosp
Campbell, James A.	1LT/MSC	7 Feb 70	67th Med Gp
Camphell, Peter B.	CPT/MC	2 Dec 69	6th Conv Ctr
Candelaria, John J.	MAJ/MSC	8 Dec 69	1/5th Inf Div
Cantu-Lara, Roberto	CPT/MC	29 Nov 69	45th Surg Hosp
Carle, Terry K	2LT/MSC	10 Feb 70	4th Inf Div
Carpenter, Joseph L.	CPT/MC	2 Dec 69	61st Med Bn
Cartwright, Mary M.	CPT/MSC	30 Nov 69	212 Cbt Avn Gp
Cash, Robert L.	CPT/MC	29 Nov 69	9th Med Lab
Cashdan, Allan R.	CPT/MC	3 Dec 69	68th Med Gp
Cavendish, John W. II	CPT/MC	5 Jan 70	1st Cav Div
Cissell, Donald J.	MAJ/MSC	20 Dec 69	93d Evac Hosp
Chapman, Joanne E.	CPT/ANC	10 Jan 70	101st Abn Div
Chase, Melvyn A.	CPT/MC	2 Dec 69	71st Evac Hosp
Chastain, Samuel H.	CPT/MC	7 Feb 70	101st Abn Div
Cho, Gordon W.	2LT/MSC	8 Feb 70	1st Cav Div
Christensen, Donna M.	LTC/ANC	15 Jan 70	18th Surg Hosp
Cobb, Charles R.	CPT/MC	7 Jan 70	27th Surg Hosp
Cocchiara, John L.	MAJ/MC	3 Feb 70	5th Sp Frc Gp
Cole, Donald R.	2LT/MSC	7 Feb 70	8th Field Hosp
Coleman, Philip D. Jr.	CPT/MC	20 Jan 70	199th LID
Collins, Patrick J.	2LT/MSC	7 Feb 70	173d Abn Bde
			11th ACR

NAME	GRADE & BRANCH	ARRIVED	ASSIGNED TO
Conly, Marjorie J.	LTC/ANC	7 Jan 70	71st Evac Hosp
Conner, Marshall A.	2LT/MSC	19 Nov 69	199th Inf Bde
Contin-Lopez, Juan U	MAJ/MC	3 Dec 69	9th Med Lab
Cook, James L.	CPT/MC	20 Dec 69	4th Inf Div
Cool, Neil T.	2LT/MSC	8 Dec 69	24th Evac Hosp
Cooper, Anthony J. Jr.	2LT/MSC	19 Nov 69	25th Inf Div
Copeland, Francis A.	LTC/MSC	23 Jan 70	67th Med Gp
Corbridge, Elizabeth	1LT/ANC	12 Feb 70	18th Surg Hosp
Cormier, Leslie A.	1LT/ANC	2 Jan 70	17th Field Hosp
Costello, Joseph A. Jr	1LT/MSC	18 Nov 69	68th Med Gp
Cotlar, Sidney A.	1LT/MSC	11 Dec 69	932d Med Det
Cox, Charles E.	CPT/MC	6 Jan 70	12th Avn Gp
Cox, David C.	CPT/MSC	17 Dec 69	44th Med Bde
Cox, Marcus A.	1LT/MSC	28 Nov 69	68th Med Gp
Craighton, Kathleen J.	1LT/ANC	5 Jan 70	24th Evac Hosp
Creer, Stephen M.	CPT/MC	27 Nov 69	1st Cav Div
Crowley, Frederick W.	CPT/MC	7 Feb 70	164th Avn Gp
Curran, Edward A.	CPT/MC	6 Jan 70	12th Avn Gp
Czepak, William	1LT/MSC	18 Feb 70	4th Inf Div
Damron, Thomas C.	1LT/MSC	2 Feb 70	25th Inf Div
DeLucia, Gerald A.	CPT/MSC	18 Jan 70	575th Med Det
Dennis, Margaret A.	1LT/ANC	16 Feb 70	95th Evac Hosp
Dennison, Joseph R.	CPT/MC	30 Nov 69	68th Med Gp
DeWitt, John D.	CPT/MC	20 Dec 69	1st Inf Div
Dewton, Ruth E.	CPT/AMSC	17 Jan 70	3d Field Hosp
Dievendorf, Lynn A.	CPT/MSC	2 Dec 69	5th Sp Frc Gp
Dober, Stanley	CPT/MC	27 Nov 69	18th Surg Hosp
Doidge, James E.	2LT/MSC	24 Nov 69	68th Med Gp
Dollak, Marilyn J.	1LT/ANC	6 Dec 69	71st Evac Hosp
Doman, James E.	2LT/MSC	28 Nov 69	3d Bde, 9th Inf Div
Domenici, Trice L.	1LT/ANC	19 Feb 70	3d Field Hosp
Donnelly, Walt G.	CPT/MC	6 Jan 70	101st Abn Div
Doyle, Donald E.	CPT/MC	5 Dec 69	12th Cbt Avn Gp
Drake, Rebecca J.	2LT/ANC	26 Jan 70	95th Evac Hosp
Drake, Robert E. Jr.	1LT/MSC	20 Nov 69	5th Sp Frc Gp
Draus, John M.	CPT/MC	6 Jan 70	1st Inf Div
Durand, Linda M.	1LT/ANC	19 Feb 70	93d Evac Hosp
Durfee, David A.	CPT/MC	6 Jan 70	Americal
Eakins, Kent R.	CPT/MC	29 Nov 69	23 Inf Div

NAME	GRADE & BRANCH	ARRIVED	ASSIGNED TO
Eck, Frederick John Jr.	CPT/MC	30 Jan 70	101st Abn Div
Eckert, Joseph C.	CPT/MC	6 Jan 70	1st Cav Div
Eckman, Mark R.	CPT/MC	29 Nov 69	43d Med Gp
Ehrichs, Edward L. Jr.	CPT/MC	7 Dec 69	93d Evac Hosp
Eisaman, Charlotte C.	2LT/ANC	11 Dec 69	3d Field Hosp
Eitler, Vincent M. II	CPT/MSC	7 Jan 70	68th Med Gp
Elliot, Frank E. III	CPT/MC	29 Nov 69	43d Med Gp
Elliott, Howard R. III	2LT/MSC	10 Jan 70	1st Cav Div
Ellis, Jaon W. III	CPT/MC	2 Dec 69	17th Cbt Avn Gp
Engle, George H.	CPT/MC	29 Nov 69	43d Med Gp
Erickson, Leland E.	CPT/MSC	31 Dec 69	32d Med Depot
Estabrook, Robert H.	2LT/MSC	2 Dec 69	25th Inf Div
Estrera, Luis G.	CPT/MC	20 Dec 69	43d Med Gp
Faller, Mary E.	2LT/ANC	15 Feb 70	67th Evac Hosp
Fay, Rose J.	1LT/MSC	16 Nov 69	43d Med Gp
Feldman, Mark A.	CPT/MC	29 Nov 69	67th Med Gp
Fike, Sandra G.	1LT/ANC	7 Jan 70	18th Surg Hosp
Florez-Mas, Luis R.	CPT/MC	17 Dec 69	43d Med Gp
Foley, Michael H.	2LT/MSC	6 Dec 69	933d Med Det
Folk, Marie E.	2LT/ANC	16 Feb 70	95th Evac Hosp
Fong, Wesley F.	1LT/MSC	24 Nov 69	23d Inf Div
Fonseca, Carlos M.	CPT/MSC	18 Dec 69	101st Abn Div
Franco, Carlos M.	CPT/MC	3 Dec 69	12th Cbt Avn Gp
Frank, Peter	CPT/MC	30 Nov 69	68th Med Gp
Frederickson, Marvin D.	CPT/MC	7 Feb 70	212th Avn Bn
Frei, Jean M.	2LT/ANC	7 Jan 70	85th Evac Hosp
Fujimoto, Gary M.	CPT/MC	30 Nov 60	68th Med Gp
Fulkerson, Phillip K.	CPT/MC	29 Nov 69	68th Med Gp
Furbish, Bruce G.	2LT/MSC	7 Feb 70	67th Med Gp 27th Surg Hosp
Gaddis, Larry D.	CPT/MSC	31 Dec 69	20th Prev Med
Gale, John R. Jr.	2LT/MSC	11 Feb 70	71st Evac Hosp
Gall, John Andrew	CPT/MC	5 Dec 69	43d Med Gp
Gall, Randall J.	CPT/MC	29 Nov 69	43d Med Gp
Gamble, David E.	CPT/MC	29 Nov 69	68th Med Gp
Gandar. Beatrice	CPT/ANC	11 Feb 70	91st Evac Hosp
Garms, Roger K.	1LT/MSC	3 Dec 69	43d Med Gp
Garnella, Thomas W.	2LT/MSC	7 Feb 70	1st Cav Div
Garrett, Floyd R. Jr.	CPT/VC	3 Dec 69	1st Log Cmd

NAME	GRADE & BRANCH	ARRIVED	ASSIGNED TO
Garrett, Michael M.	1LT/MSC	12 Feb 70	68th Med Gp
Genthner, Carolyn	CPT/ANC	1 Jan 70	12th Evac Hosp
Genthner, Sandra L.	CPT/ANC	10 Jan 70	91st Evac Hosp
Gipson, Joe B.	LTC/MSC	18 Nov 69	91st Evac Hosp
Gipson, Shirley J. L.	MAJ/MSC	18 Nov 69	27th Surg Hosp
Glover, Don W.	2LT/MSC	7 Feb 70	68th Med Gp 68th Med Det
Gold, John M.	CPT/MC	10 Jan 70	93d Evac Hosp
Golden, Roland W. Jr.	CPT/MSC	31 Jan 70	23d Inf Div
Goldhorn, Donald J.	1LT/Msc	20 Jan 70	67th Med Gp
Goodenow, John S.	CPT/MC	29 Nov 69	67th Med Gp
Gooding, Barbara V.	1LT/ANC	13 Feb 70	95th Evac Hosp
Goodman, Allen R.	CPT/MC	29 Nov 69	68th Med Gp
Gort, Vera M.	2LT/ANC	14 Dec 69	12th Evac Hosp
Graham, Carol A.	1LT/ANC	14 Feb 70	3d Field Hosp
Graham, Judith M.	2LT/ANC	23 Nov 69	91st Evac Hosp
Gray, Grace A.	2LT/ANC	8 Dec 69	93d Evac Hosp
Gregg, David E.	1LT/MSC	18 Nov 69	4th Inf Div
Griffin, Michael W.	2LT/MSC	17 Nov 69	101st Inf Div
Gulling, Jaqueline A.	1LT/ANC	19 Feb 70	93d Evac Hosp
Gustafson, Patricia L.	2LT/ANC	23 Nov 69	67th Evac Hosp
Hadden, Donald R.	MAJ/MSC	13 Jan 70	32 Med Depot
Hagan, James L.	CPT/MC	6 Jan 70	1st Cav Div
Hagarty, Catherine R.	MAJ/ANC	23 Nov 69	3d Field Hosp
Hallisey, Dennis L.	CPT/MSC	19 Nov 69	23d Inf Div
Hamer, Merlin L.	CPT/MC	20 Jan 70	68th Med Gp
Hampton, Foster T. III	CPT/MC	29 Nov 69	67th Med Gp
Hankins, Cecile J.	LTC/ANC	9 Dec 69	93d Evac Hosp
Hancock, Roy E.	1LT/MSC	14 Dec 69	43d Med Gp
Hanneman, Robert E.	CPT/MSC	20 Nov 69	9th Med Lab
Harmon, Conley	1LT/MSC	3 Dec 69	101st Abn Div
Harris, James D.	CPT/ MC	30 Nov 69	68th Med Gp
Hart, Clarence R.	MAJ/MC	18 Nov 69	3d Surg Hosp
Harvey, Charles T.	CPT/MC	2 Dec 69	17th Cbt Avn Gp
Hatfield, Dorothy J.	2LT/ANC	23 Nov 69	67th Evac Hosp
Hawking, Richard H. III	2LT/MSC	7 Feb 70	1/5th Inf Div
Hawkins, Kerry	CPT/MSC	6 Jan 70	105th Med Det
Hays, William L.	LTC/VC	15 Feb 70	175th Vet Det
Heilbrunn, Howard I.	CPT/MC	29 Nov 69	68th Med Gp
Helwig, Andrew A.	1LT/MSC	20 Dec 69	25th Inf Div

NAME	GRADE & BRANCH	ARRIVED	ASSIGNED TO
Heravi, Cyrus	MAJ/MC	3 Feb 70	3d Surg Hosp
Herrington, Joyce	CPT/ANC	25 Jan 70	8th Field Hosp
Hesselman, Barbara J.	2LT/ANC	19 Feb 70	24th Evac Hosp
Hickey, Thomas Edward	CPT/VC	27 Nov 69	175th Med Det
Hiller, Frederick C. II	CPT/MC	7 Jan 70	12th Cbt Avn Gp
Hirsch, Edward H.	MAJ/DC	3 Feb 70	5th Spc Frc Gp
Hoffman, John D.	CPT/ANC	30 Nov 69	68th Med Gp
Holland, Gary C.	CPT/MC	15 Feb 70	8th Field Hosp
Hollingsworth, Thomas H.	CPT/MC	29 Nov 69	68th Med Gp
Hosley, Morrison J. Jr.	MAJ/MSC	16 Nov 69	67th Med Gp
Husdon, Charles P.	2LT/MSC	31 Dec 69	67th Med Gp
Hughes, Michael G.	CPT/MC	16 Nov 69	11th ACR
Hupfield, Stanley F.	1LT/MSC	29 Dec 69	1st Cav Div
Immesoete, Phillip A.	CPT/MC	27 Nov 69	1st Inf Div
Ishiki, Dean M.	CPT/MC	30 Nov 69	68th Med Gp
Jacoby, Thomas G.	CPT/MSC	19 Jan 70	68th Med Gp
Jackson, Hester M.	MAJ/ANC	23 Nov 69	12th Evac Hosp
Jaeger, Diane C.	1LT/ANC	8 Feb 70	24th Evac Hosp
Jaeger, Roy E. Jr.	2LT/MSC	7 Feb 70	68th Med Gp 50th Med Co
James, Jenny R.	1LT/ANC	7 Jan 70	18th Surg Hosp
Janas, Chester J. Jr.	CPT/MC	29 Nov 69	68th Med Gp
Jaquez, Virginia	CPT/ANC	28 Jan 70	3d Field Hosp
Jennings, Paul B. Jr.	MAJ/VC	21 Jan 70	4th Med Det
Jewett, Stiles Turner Jr.	CPT/MC	2 Dec 69	17th Cbt Avn Gp
Jolin, Janet P.	MAJ/AMSC	1 Dec 69	68th Med Gp
Jones, Brian S.	2LT/MSC	31 Dec 69	101st Abn Div
Jones, Henry E.	MAJ/MC	18 Dec 69	95th Evac Hosp
Jordan, France F.	LTC/MSC	24 Dec 69	USAMEDCOMV
Juhasz, Carol A.	2LT/ANC	5 Jan 70	24th Evac Hosp
Kamell, William M.	CPT/MC	3 Feb 70	23d Inf Div
Kahn, Arthur M.	MAJ/MC	3 Dec 69	3d Surg Hosp
Kapp, John P.	MAJ/MC	12 Jan 70	24th Evac Hosp
Kaufman, Jay H.	CPT/MC	3 Feb 70	101st Abn Div
Kaveny, Donald B.	1LT/MSC	28 Nov 69	67th Med Gp
Keinincham, Frank	2LT/ANC	14 Feb 70	24th Evac Hosp

NAME	GRADE & BRANCH	ARRIVED	ASSIGNED TO
Keller, Raymond L.	2LT/MSC	13 Jan 70	25th Inf Div
Kent, James J.	MAJ/MC	6 Jan 70	Americal Div
Kerchmar, James A.	2LT/MSC	31 Dec 69	173d Abn Div
Kerns, Diana S.	2LT/ANC	5 Jan 70	12th Evac Hosp
Kerske, Martin L.	CPT/VC	3 Dec 69	4th Med Det
Khan, Faridoon	MAJ/MC	18 Jan 70	24th Evac Hosp
Kienstra, Randy A.	CPT/MC	29 Nov 69	43d Med Gp
Kijowski, Richard S.	CPT/MC	30 Nov 69	68th Med Gp
King, Joyce W.	MAJ/ANC	28 Jan 70	71st Evac Hosp
Kjerulf, Terrell	CPT/MC	18 Jan 70	93d Evac Hosp
Klee, Robert J.	2LT/MSC	12 Dec 69	25th Inf Div
Knox, Kenneth E.	2LT/MSC	27 Nov 69	67th Med Gp
Kopecky, Chris L.	1LT/MSC	7 Jan 70	12th Evac Hosp
Kouba, Kendall S.	2LT/MSC	19 Nov 69	23d Inf Div
Kovach, Frank J.	MAJ/MSC	13 Jan 70	32d Med Depot
Kozek, John R.	CPT/MC	29 Nov 69	68th Med Gp
Kreiner, John E.	CPT/MSC	20 Nov 69	67th Med Gp
Kronenberg, Howard A.	CPT/MC	19 Feb 70	11th ACR
Kruger, Elizabeth A.	CPT/ANC	10 Jan 70	85th Evac Hosp
Kyker, James S.	CPT/MC	29 Nov 69	1/5th Inf Bde
Laird, Terry S.	CPT/MC	29 Nov 69	43d Med Gp
LaManna, Mary P.	2LT/ANC	16 Nov 69	3d Field Hosp
Lamar, Sharon J.	CPT/ANC	24 Nov 69	91st Evac Hosp
Lambert, Sharon L.	CPT/ANC	4 Jan 70	93d Evac Hosp
Lamster, Richard D.	1LT/MSC	23 Dec 69	91st Evac Hosp
Lander, Walter E. Jr.	2LT/ANC	14 Feb 70	93d Evac Hosp
Lankheet, Elaine R.	2LT/ANC	10 Jan 70	91st Evac Hosp
Larson, Peter M.	2LT/MSC	7 Feb 70	68th Med Gp 221 Med Det
Latina, Joseph A.	CPT/MC	29 Nov 69	43d Med Gp
Lawrence, Pattye M.	CPT/ANC	15 Jan 70	24th Evac Hosp
Leach, Paul J.	CPT/MSC	25 Jan 70	1st Cav Div
Leaser, Ruth M.	2LT/ANC	26 Nov 69	45th Surg Hosp
Ledford, Kenneth Jr.	1LT/MSC	18 Nov 69	45th Med Co
Lemoine, Jean-Claude	LTC/MC	5 Jan 70	85th Evac Hosp
Lemon, Rodman Jr.	CPT/MC	29 Nov 69	68th Med Gp
Leslie, James R.	MAJ/MC	24 Nov 69	3d Bde 9th Inf Div
Lester, Gordon J.	CPT/MC	29 Nov 69	68th Med Gp
Lewis, Donald K.	CPT/MC	5 Jan 70	93d Evac Hosp
Liebl, David G.	2LT/MSC	19 Nov 69	3d Bde 9th Inf Div
Lindert, David J.	CPT/MC	1 Dec 69	68th Med Gp

NAME	GRADE & BRANCH	ARRIVED	ASSIGNED TO
Little, Douglas G.	2LT/MSC	19 Nov 69	25th Inf Div
Locke, Earl D.	2LT/MSC	2 Jan 70	1st Avn Bde
Loft, Richard D.	1LT/MSC	6 Dec 69	25th Inf Div
Logan, Robert F.	MAJ/MSC	29 Nov 69	32d Med Depot
London, John H.	2LT/MSC	9 Jan 70	1st Cav Div
Longnecker, Joseph M.	CPT/MC	17 Dec 69	1st Cav Div
Lose, Stephen A.	2LT/MSC	2 Dec 69	56th Med Det
Luem, Carl R.	CPT/MC	29 Nov 69	68th Med Gp
Lunceford, Jay R.	2LT/MSC	5 Dec 69	1st Inf Div
Lund, Larry A.	CPT/ANC	15 Dec 69	18th Surg Hosp
Lyons, Charles Roger Jr.	CPT/MC	3 Dec 69	25th Inf Div
Magaziner, Harvey E.	CPT/MSC	1 Dec 69	1st Cav Div
Maggart, Thomas A.	1LT/MSC	16 Dec 69	23d Inf Div
Maier, Joseph T.	CPT/MC	29 Nov 69	67th Med Gp
Maharry, Randall R.	CPT/MC	2 Dec 69	17th Cbt Avn Gp
March, Donald D.	2LT/ANC	31 Jan 69	43d Med Gp
Margulies, Robert E.	2LT/MSC	7 Feb 70	8th Field Hosp 68th Med Gp
Martin, Lewis K.	CPT/MC	7 Feb 70	299th Med Det 1st Cav Div
Martinez-Bougin, Gustavo	CPT/MC	29 Nov 69	67th Med Gp
Masterson, Robert E.	CPT/MC	27 Nov 69	199th Lt Inf Bde
Mastromonaco, Edward D.	CPT/MC	29 Jan 70	173d Abn Bde
Maxin, Henry A. Jr.	CPT/DE	18 Jan 70	137th Med Det
Maxner, Stephen B.	2LT/MSC	31 Jan 69	3d Bde 9th Inf Div
McHeth, David E.	CPT/ MC	20 Dec 69	1st Inf Div
McKeithen, Bertram	2LT/MSC	24 Nov 69	101st Abn Div
McMillan, Gary L.	CPT/MC	6 Jan 70	12th Avn Gp
McNeely, William J. Jr.	1LT/MSC	25 Dec 69	67th Med Gp
McNeill, Joseph L.	2LT/Msc	12 Feb 70	24th Evac Hosp
McQueen, Samuel G.	2LT/MSC	7 Feb 70	68th Med Gp 418th Med Co
Meinardus, Paul R.	2LT/MSC	16 Dec 69	101st Abn Div
Menacho, Dilio	MAJ/MC	20 Dec 69	4th Inf Div
Mendelson, Janice A.	LTC/MC	29 Jan 70	MACV
Mercado, Modesto G.	CPT/MC	1 Dec 69	91st Evac Hosp
Meshad, Floyd G.	CPT/MSC	27 Jan 70	95th Evac Hosp
Metcalf, Muriel D.	1LT/ANC	18 Jan 70	3d Field Hosp
Mieves-Concepcion Nora	2LT/ANC	20 Dec 69	12 Evac Hosp
Miller, Allan R.	CPT/ MSC	10 Jan 70	27th Surg Hosp
Mills, Ronald H.	CPT/VC	3 Dec 69	4th Med Det

NAME	GRADE & BRANCH	ARRIVED	ASSIGNED TO
Moeller, Steven A.	CPT/MC	6 Jan 70	17th Avn Gp
Mojica, Simon T.	1LT/MSC	11 Jan 70	1st Cav Div
Monsoon, David O.	MAJ/MC	30 Jan 70	3d Field Hosp
Montalvo-Alamo, Freddie	CPT/MC	22 Jan 70	20th Engr Bde
Moon, Richard S.	2LT/MSC	20 Nov 69	101st Abn Div
Moore, Terrence L.	2LT/MSC	16 Nov 69	1st Inf Div
Moriarty, Francis M.	CPT/ANC	14 Dec 69	18th Surg Hosp
Morris, Wayne S.	MAJ/ANC	10 Feb 70	3d Field Hosp
Morrison, Russell A.	CPT/MC	29 Nov 69	67th Med Gp
Muir, John R.	CPT/MC	21 Jan 70	93d Evac Hosp
Mukerjee, Manju G.	MAJ/MC	20 Dec 69	Americal Div
Mule, Lawrence C.	2LT/MSC	30 Nov 69	1st Avn Bde
Munroe, Alyce S.	CPT/ANC	10 Jan 70	93d Evac Hosp
Murphy, Patricia T.	COL/ANC	31 Dec 69	USAMEDCOMV
Navone, Timothy W.	2LT/MSC	20 Dec 69	68th Med Gp
Nelson, Ellis H.	CPT/MC	29 Nov 69	68th Med Gp
Nemikas, Vidas	CPT/MC	3 Dec 69	101st Abn Div
Nickels, Dennis J.	2LT/MSC	20 Nov 69	Americal Div
Niemann, Jeffrey M.	CPT/MC	27 Nov 69	XXIV Corps
Noble, Dennis R.	2LT/MSC	31 Dec 69	932d Med Det
Norden, Lyman C.	CPT/MSC	10 Feb 70	101st Abn Div
Ochsenchlager, Daniel W.	CPT/MC	11 Jan 70	93d Evac Hosp
Odum, David J.	CPT/MSC	22 Nov 69	101st Abn Div
Olson, Henry W.	CPT/MC	6 Jan 70	Americal Div
Osteria, Vincent M.	CPT/MC	27 Nov 69	4th Inf Div
Oswald, Dorothy E.	1LT/ANC	14 Feb 70	3d Field Hosp
Owen, Ronald S.	2LT/MSC	5 Dec 69	101st Abn Div
Palmer, Gerald A.	2LT/MSC	2 Dec 69	23d Inf Div
Parry, Kirk A.	CPT/MSC	17 Nov 69	935th Med Det
Patterson, Elbert C.	2LT/MSC	20 Nov 69	1st Inf Div
Pearson, Bruce Reuel	CPT/MC	2 Dec 69	101st Abn Div
Pepper, Anibal A.	MAJ/MC	3 Feb 70	23d Inf Div
Perchalski, John E.	CPT/MC	29 Nov 69	67th Med Gp
Perrault, Patricia E.	2LT/ANC	19 Feb 70	3d Field Hosp
Perry, Leslie R.	CPT/VC	30 Nov 69	4th Med Det
Pershing, Jack K.	CPT/MC	12 Dec 69	23d Inf Div
Peterson, Delores C.	CPT/ANC	3 Dec 69	93d Evac Hosp

NAME	GRADE & BRANCH	ARRIVED	ASSIGNED TO
Peterson, Ralph D.	1LT/MSC	20 Dec 69	USAMEDCOMV
Pitcher, George M.	CPT/MC	7 Feb 70	101st Abn Div
Porinsh, Peter V.	2LT/MSC	14 Dec 69	6th Conv Ctr
Porter, Lynne C.	2LT/ANC	16 Feb 70	93d Evac Hosp
Rabanal, Aristotle A.	MAJ/MC	20 Jan 70	18th Surg Hosp
Rankin, Joseph D.	2LT/MSC	7 Feb 70	68th Med Gp 575th Med Det
Rausch, Joseph W.	2LT/MSC	7 Feb 70	932d Med Det
Rautbort, Jaclyn S.	1LT/ANC	10 Jan 70	3d Field Hosp
Rawlins, James D. Jr.	CPT/DC	23 Dec 69	101st Abn Div
Reed, David J.	CPT/MSC	16 Feb 70	68th Med Gp 349th Med Det
Reisher, Richard G.	CPT/MC	8 Jan 70	68th Med Gp
Renn, John S. II	MAJ/MC	12 Feb 70	1/5th Inf Div
Respet, Patrick B.	CPT/MC	1 Dec 69	43d Med Gp
Restituto, Norberto R.	CPT/MC	17 Dec 69	11th ACR
Riester, Anthony C.	1LT/ANC	8 Feb 70	85th Evac Hosp
Richardson, Robert G.	CPT/MC	21 Dec 69	67th Med Gp
Ritchie, James L. IV	1LT/MSC	23 Nov 69	68th Med Gp
Rhodes, John M. Jr.	CPT/MC	29 Nov 69	43d Med Gp
Roberts, Condred W.	CPT/ANC	14 Dec 69	71st Evac Hosp
Roe, Phillip J.	CPT/MSC	15 Feb 70	3d Field Hosp
Rogers, Earle J.	CPT/MC	6 Jan 70	17th Avn Gp
Roth, Susan K.	2LT/ANC	5 Jan 70	12th Evac Hosp
Ruf, Walter R.	MAJ/MC	13 Feb 70	85th Evac Hosp
Rush, Linda L.	2LT/ANC	23 Nov 69	6th Conv Ctr
Scanlon, James W.	CPT/MSC	23 Jan 70	172d Prev Med
Scott, Larry P.	1LT/MSC	16 Dec 69	32d Med Depot
Schatzman, Ronald C.	MAJ/MC	17 Jan 70	95th Evac Hosp
Schilling, Carolyn H.	1LT/ANC	10 Jan 70	93d Evac Hosp
Schlegal, Mary K	1LT/ANC	10 Jan 70	71st Evac Hosp
Schlomer, Gregory A.	CPT/VC	3 Dec 69	4th Med Det
Schroeder, Robert H.	2LT/MSC	7 Dec 69	Americal Div
Schwartz, Allen	1LT/MSC	19 Feb 70	101st Abn Div
Scrensen, Gregory W.	CPT/MC	29 Nov 69	68th Med Gp
Sebek, Diana M.	1LT/ANC	10 Jan 70	18th Surg Hosp
Seibert, Summer	CPT/MC	29 Nov 69	68th Med Gp
Seitz, Ellery R.	2LT/MSC	20 Nov 69	43d Med Gp
Settle, Betty J.	CPT/ANC	24 Dec 69	93d Evac Hosp

NAME	GRADE & BRANCH	ARRIVED	ASSIGNED TO
Share, Neal E.	CPT/MC	29 Nov 69	25th Inf Div
Shelton, Robert L.	MAJ/MC	8 Feb 70	91st Evac Hosp
Shoup, Kenneth J.	MAJ/MSC	13 Jan 70	32d Med Depot
Silbernagel, Gary M	2LT/MSC	2 Jan 70	101st Abn Div
Simons, Bryan E. Jr.	MAJ/MC	3 Feb 70	27th Surg Hosp
Sloboda, Valerie D.	2LT/ANC	31 Jan 70	93d Evac Hosp
Smerlinski, Margaret A.	1LT/ANC	15 Feb 70	95th Evac Hosp
Smith, Henry W. Jr.	2LT/MSC	28 Nov 69	67th Med Gp
Smith, John W. Jr.	2LT/MSC	20 Nov 69	67th Med Gp
Smith, Norbert G.	2LT/MSC	13 Dec 69	932d Med Det
Smith, Robert J.	CPT/DC	3 Dec 69	1st Cav Div
Sorenson, Lloyd W.	CPT/VC	23 Nov 69	4th Med Det
Sorensen, Warren G.	CPT/MC	13 Dec 69	85th Evac Hosp
Sowell, John M.	LTC/MC	22 Jan 70	20th Prev Med
Sperber, Gary W.	CPT/VC	3 Dec 69	1st Log Cmd
Spielvogel, Allen	CPT/MC	29 Nov 69	67th Med Gp
Spreen, Steven A.	CPT/MC	29 Nov 69	68th Med Gp
Sprowls, Karen S.	CPT/ANC	30 Nov 69	67th Med Gp
Srubar, Jo A.	2LT/ANC	15 Feb 70	95th Evac Hosp
Stagg, Earl R.	CPT/MC	29 Nov 69	43d Med Gp
Stark, Marifran	1LT/ANC	18 Jan 70	12th Evac Hosp
Stasikowski, Jacok J.	CPT/MC	1 Dec 69	24th Evac Hosp
St. Gemme, William L.	CPT/MSC	23 Nov 69	1st Inf Div
Stoebner, John M.	LTC/MC	18 Dec 69	58th Med Bn
Story, Robert H.	CPT/MC	20 Jan 70	173d Abn Bde
Stralka, Marie T.	2LT/ANC	26 Nov 69	45th Surg Hosp
Straub, William J.	1LT/MSC	24 Nov 69	4th Inf Div
Strauss, Dennis F.	CPT/MC	7 Jan 70	17th Cbt Avn Gp
Strong, Carolyn J.	1LT/ANC	15 Feb 70	95th Evac Hosp
Stucker, Paul J.	MAJ/MC	16 Feb 70	24th Evac Hosp
Stuebe, Richard R.	1LT/MSC	18 Jan 70	67th Med Gp
Sullivan, John W.	MAJ/MC	6 Jan 70	91st Evac Hosp
Sutton, Sandra Lynn	2LT/ANC	16 Nov 69	71st Evac Hosp
Saggio, Carl J.	CPT/MC	7 Feb 70	17th Avn Gp
Saleme, Anthony J.	CPT/MC	29 Nov 69	43d Med Gp
Sanders, Hollis R.	CPT/MSC	29 Nov 69	32d Med Depot
Sarfatis, Peter	MAJ/MC	3 Feb 70	24th Evac Hosp
Tabron, James R. Jr.	CPT/MSC	17 Nov 69	98th Med Det
Taliak, Martin B.	MAJ/MC	1 Feb 70	93d Evac Hosp
Tan, Sergio-Sia	MAJ/MA	27 Nov 70	3d Surg Hosp

NAME	GRADE & BRANCH	ARRIVED	ASSIGNED TO
Tancredi, Sue L	2LT/ANC	8 Feb 70	95th Evac Hosp
Tancrei, Peter L.	2LT/ MSC	7 Feb 70	67th Med Gp
			95th Evac Hosp
Tarbet, George S.	2LT/MSC	17 Nov 69	1st Cav Div
Tart, Byron L. Jr.	CPT/MSC	20 Dec 69	101st Abn Div
Taylor, Charles H.	CPT/ANC	9 Dec 69	18th Surg Hosp
Taylor, James E.	CPT/MC	16 Feb 70	17th Avn Gp
Thomas, Frank A. II	CPT/MC	5 Jan 70	164th Avn Gp
Thomas, Robert L.	CPT/MSC	31 Dec 69	1st Cav Div
Thompson, Carson J. Jr.	2LT/MSC	29 Nov 69	23d Inf Div
Toole, Howard E.	MAJ/MSC	3 Dec 69	43d Med Gp
Tranel, David A.	CPT/ANC	2 Jan 70	8th Field Hosp
Tsang, Victor Y. H.	MAJ/MC	18 Jan 70	27th Surg Hosp
Tuell, Henry O.	1LT/MSC	3 Dec 69	1st Cav Div
Turner, Orville B. Jr.	2LT/MSC	5 Dec 69	25th Inf Div
Tycast, Frank John	CPT/MC	30 Nov 69	68th Med Gp
Uemura, Rickey N.	CPT/ANC	27 Nov 69	8th Field Hosp
Valentine, Gary L.	1LT/MSC	17 Nov 69	101st Inf Div
Valenzuela, Herminio C.	CPT/MC	20 Dec 69	18th Engr Bde
Van Harn, Mary	LTC/AMSC	31 Dec 69	93d Evac Hosp
Varga, Paul	MAJ/MC	20 Dec 68	68th Med Gp
Vargas, Carlos A.	MAJ/MC	5 Dec 69	1st Cav Div
Vernick, Jerome J.	MAJ/MC	11 Dec 69	93d Evac Hosp
Villalobos, Jose L.	CPT/MC	29 Noc 69	101st Abn Div
Wailer, Jack D.	CPT/MC	7 Feb 70	164th Avn Gp
Walker, Jon G.	CPT/MC	29 Nov 69	68th Med Gp
Wallace, David L.	CPT/MC	7 Feb 70	17th Avn Gp
Waller, Charles R.	1LT/MSC	28 Nov 69	25 Inf Div
Walter, Robert Z.	1LT/MSC	13 Feb 70	67th Evac Hosp
Wan, Lawrence C.	CPT/MC	29 Nov 69	43d Med Gp
Wanchick, Michael A.	CPT/MC	29 Nov 69	1/5th Inf Div
Ware, Jean M.	MAJ/ANC	19 Jan 70	93d Evac Hosp
Watson, John W.	CPT/MC	1 Dec 69	101st Abn Div
Watson, Malcolm W. II	2LT/MSC	10 Feb 70	58th Med Bn
Watson, Robert J.	CPT/MSC	16 Nov 69	USAMEDCOMV
Weiss, Robert S.	CPT/MC	19 Feb 70	3d Surg Hosp
Weiss, Robert S.	2LT/MSC	23 Nov 69	199th Inf Bde

NAME	GRADE & BRANCH	ARRIVED	ASSIGNED TO
Wells, Rosalie K.	1LT/ANC	14 Feb 70	3d Field Hosp
West, Nina	MAJ/ANC	9 Jan 70	24th Evac Hosp
Whitaker, James A.	CPT/MC	20 Jan 70	173d Abn Bde
White, George E. III	CPT/MSC	16 Nov 69	926th Med Det
White, Maywood A.	1LT/ANC	2 Jan 70	85th Evac Hosp
Wilke, Barbara L.	2LT/ANC	24 Nov 69	6th Conv Ctr
Wilson, James C.	MAJ/VC	16 Feb 70	176th Vet Det
Winer, Michael H.	CPT/MC	22 Dec 69	18th Surg Hosp
Wirman, John A.	CPT/MC	20 Dec 69	Americal Div
Wisdom, Harry A. Jr.	CPT/MSC	28 Nov 69	1st Cav Div
Wood, Benjamin G. III	CPT/MC	5 Jan 70	93d Evac Hosp
Wood, Leslie G.	2LT/MSC	6 Dec 69	3d Bde 9th Inf Div
Woodward, James M. Jr.	CPT/VC	3 Dec 69	175th Vet Det
Woodworth, Alfred H.	CPT/MC	20 Jan 70	173d Abn Bde
Woolsey, Mary M.	1LT/ANC	2 Jan 70	18th Surg Hosp
Wright, Thomas G. Jr.	2LT/MSC	7 Feb 70	68th Med Gp 8th Field Hosp
Wroblenski, Sharon	1LT/ANC	15 Feb 70	17th Field Hosp
Younger, George W.	2LT/MSC	31 Dec 69	43d Med Gp
Zachardy, Richard W.	CPT/MSC	11 Dec 69	USAMEDCOMV
Zimmerman, Harry R.	CPT/MSC	20 Jan 70	68th Med Gp

USARV MEDICAL BULLETIN

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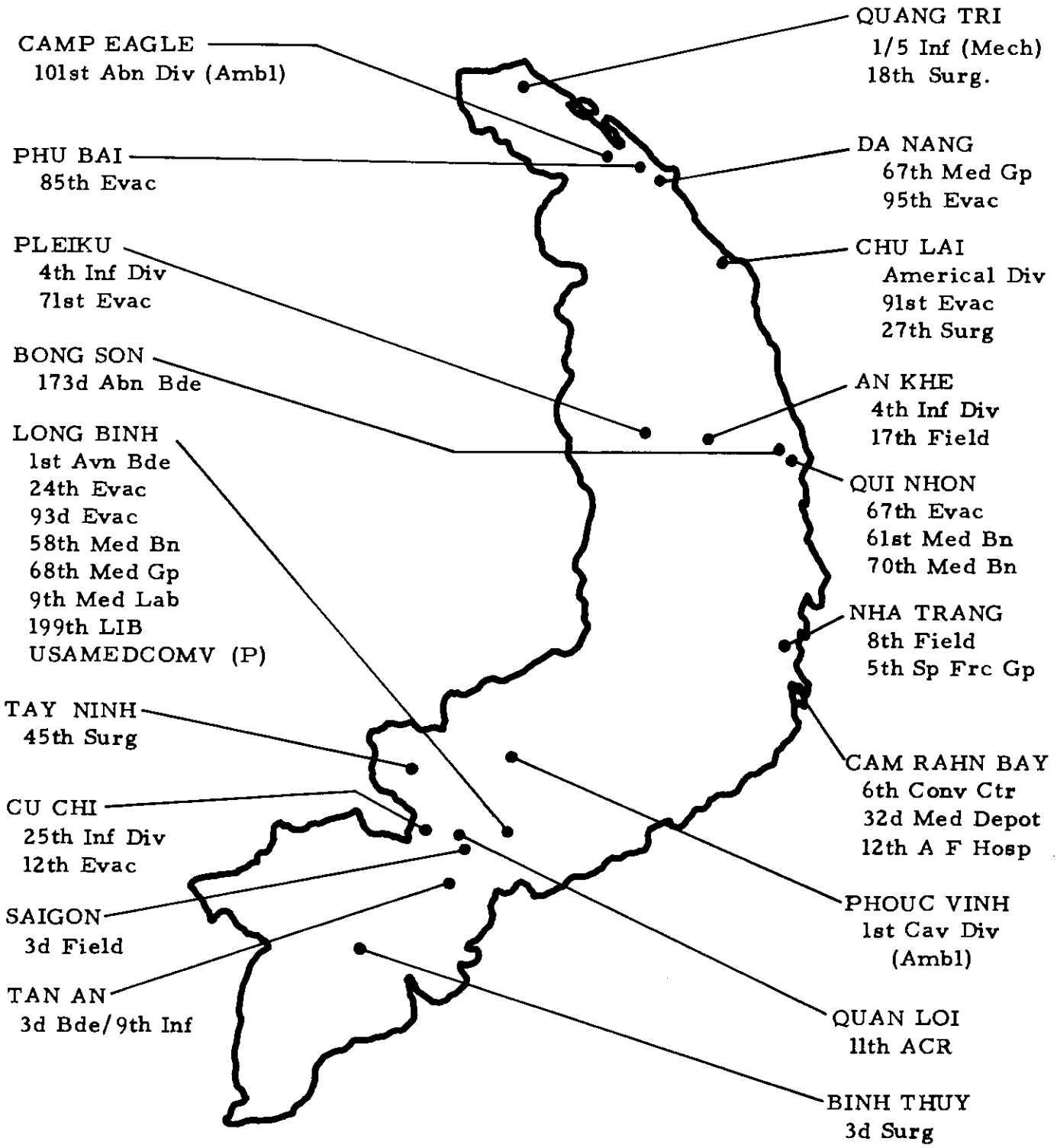
CAMP EAGLE
101st Abn Div (Ambl)
PHU BAI
85th Evac
PLEIKU
4th Inf Div
71st Evac
BONG SON
173d Abn Bde
LONG BINH
1st Avn Bde
24th Evac
93d Evac
58th Med Bn
68th Med Gp
9th Med Lab
199th LIB
USAMEDCOMV (P)
TAY NINH
45th Surg
CU CHI
25th Inf Div
12th Evac
SAIGON
3d Field
TAN AN
3d Bde/9th Inf
QUANG TRI
1/5 Inf (Mech)
18th Surg.
DA NANG
67th Med Gp
95th Evac
CHU LAI
Americal Div
91st Evac
27th Surg
AN KHE
4th Inf Div
17th Field
QUI NHON
67th Evac
61st Med Bn
70th Med Bn
NHA TRANG
8th Field
5th Sp Frc Gp
CAM RAHN BAY
6th Conv Ctr
32d Med Depot
12th A F Hosp
PHOUC VINH
1st Cav Div
(Ambl)
QUAN LOI
11th ACR
BINH THUY
3d Surg

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