

PENETRATING WOUNDS OF THE ABDOMEN*

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FROM THE SURGICAL SERVICE OF THE PENNSYLVANIA HOSPITAL

WE HAVE reviewed the records of 220 cases of penetrating wounds of the abdomen admitted to the Pennsylvania Hospital during the years 1909 to 1930 inclusive, and for the privilege of reporting them we are much indebted to Drs. John H. Gibbon and Charles F. Mitchell, surgeons-in-chief to the hospital, and to the former chiefs upon whose services they were admitted. We have not included in this series any cases with penetrating wounds other than those resulting from stab and gunshot injuries. We are considering the two groups separately because the stab wounds, as a group, are less serious than the gunshot cases, for the reason that, in the latter, there is more hæmorrhage and more extensive visceral injury.

In this series, about the usual ratio of danger of the gunshot over the stab injuries was maintained, that is, a little more than 2 to 1. The operative mortality in civil life seems to have been established around the 50 per cent. level for gunshot wounds and about 25 per cent. for the stab injuries, with a considerably higher total rate for both groups. In the gunshot cases, Wallace, reporting on 1200 cases from the British Expeditionary Force, showed an operative mortality of 53.9 per cent., and a total mortality including non-operative cases of 60.2 per cent. Lockwood, Kennedy, *et al.*, in military service, reported on 500 cases with an operative mortality of 51.97 per cent. In 1902, Fener reported on 152 cases of gunshot wounds from the Charity Hospital, New Orleans, 96 of which suffered visceral injury with 71 deaths (74 per cent.). Bivings, in 66 cases operated upon, reported a mortality of 60.6 per cent. McKeithen's mortality on 56 gunshot cases was 44.6 per cent., and on 13 stab cases 30.7 per cent.

The experience of the Charity Hospital in New Orleans in these injuries seems to have been greater than that of any other institution, and they have appointed, under the direction of Doctor Matas, a special committee for the study of these cases. Miller's report on a personal experience in 46 cases operated upon there with 23 recoveries, and a paper by Loria dealing with "visceral injuries in gunshot wounds of the abdomen" are the latest communications from this institution. Mason, in his last report, analyzed 127 cases, stressing the influence of hæmorrhage on mortality, and has divided his series into a large and small hæmorrhage group regardless of visceral injury, showing a mortality of 87.2 per cent. in the large hæmorrhage series, and 36.1 per cent. in the small hæmorrhage series. He urges strongly the

*Read before the Philadelphia Academy of Surgery, May 4, 1931.

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more routine use of blood transfusion in these cases. Condit has reported a series of 20 cases from the Gouverneur Hospital, with 11 recoveries.

Winslow, in a report of 31 cases of gunshot and stab wounds of the abdomen treated at the University Hospital, Baltimore, resulting in 16 recoveries and 15 deaths, says that in two cases which died, perforations of the intestine were overlooked at operation. We feel that overlooked injury at the time of operation is one of the most important causes of the present high death rate in perforating wounds of the abdomen. Since studying our own series we are more strongly convinced than ever of this fact, and we may add that with this conviction there has also come a good deal of chagrin, and a lesson which we know will be helpful personally and we hope may be of some assistance to others in the treatment of these injuries. The operations in our series were performed by the attending and assistant attending members of the staff, and the former chief resident physicians of the hospital during this period.

TABLE I

	<i>Stab Cases</i>			<i>Gunshot Cases</i>		
	Recoveries	Deaths		Recoveries	Deaths	
		Operative	Non-operative		Operative	Non-operative
Age average...	31.7	40.5	33	26.1	32.9	31
Colored.....	35	7	2	20	24	6
White.....	27	10	2	41	31	14
Male.....	56	15	4	53	47	18
Female.....	6	2	0	8	8	2

Stab Wounds

Total stab-wound cases.....	84	{ recoveries..... 63 deaths..... 21
Cases operated upon.....	77	{ recoveries..... 60 deaths..... 17
Cases not operated upon.....	7	{ recoveries..... 3 deaths..... 4

The total mortality of the stab-wound cases is 25 per cent.; the operative mortality is 22 per cent. A brief analysis of the cases recovering after operation revealed that in 19 instances there was penetration without visceral injury.

GROUP I

Stab-wound Injuries—Operation—Recovery

CASE I.—Colored man, thirty-two years old. Operation, hours after injury.—? Location of wound.—Upper right abdomen. Operative findings.—Wound of liver, diaphragm and pleura. Operation.—Laparotomy, liver pack, secondary rib resection, drainage. Complications.—Sub-diaphragmatic abscess. Days in hospital.—Sixty-five.

CASE II.—Colored man, thirty-one years old. Operation, hours after injury.—Three and one-half. Location of wound.—Lower right abdomen, anterior. Operative

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findings.—Intestine protruding; slight hæmorrhage. Operation.—Exploratory laparotomy; irrigation N. S. S.; drainage. Days in hospital.—Twenty-one.

CASE III.—White man, twenty-three years old. Operation, hours after injury.—? Location of wound.—Lower right abdomen, anterior. Operative findings.—Penetrating wound; slight hæmorrhage. Operation.—Exploratory laparotomy; no drainage. Days in hospital.—Eighteen.

CASE IV.—White man, forty-seven years old. Operation, hours after injury.—One and one-half. Location of wound.—Upper left abdomen, anterior. Operative findings.—Laceration of mesentery, slight hæmorrhage. Operation.—Laparotomy, ligation; no drainage; irrigation N. S. S. Days in hospital.—Twenty.

CASE V.—White man, sixteen years old. Operation, hours after injury.—? Location of wound.—Lower left abdomen, anterior. Operative findings.—Four perforations ileum; laceration of mesentery; severe hæmorrhage. Operation.—Enterorrhaphy; irrigation N. S. S.; drainage. Days in hospital.—Thirty-two.

CASE VI.—White man, thirty-one years old. Operation, hours after injury.—One and one-quarter. Location of wound.—Upper left abdomen, from back. Operative findings.—Wound of spleen; diaphragm; pleura; slight hæmorrhage. Operation.—Laparotomy; drainage. Complications.—Pulmonary collapse. Days in hospital.—Twelve.

CASE VII.—Colored man, fifty years old. Operation, hours after injury.—Two. Location of wound.—Upper left abdomen, anterior. Operative findings.—Two perforations stomach; slight hæmorrhage. Operation.—Gastrorrhaphy; no drainage. Complications.—Local peritonitis. Days in hospital.—Thirty.

CASE VIII.—Colored man, thirty-six years old. Operation, hours after injury.—Three. Location of wound.—Upper mid-abdomen. Operative findings.—Wound of stomach; evisceration of stomach and omentum; moderate hæmorrhage. Operation.—Gastrorrhaphy. Days in hospital.—Thirteen.

CASE IX.—White man, twenty years old. Operation, hours after injury.—Four and one-half. Location of wound.—Upper left abdomen. Operative findings.—One perforation of small intestine; laceration mesentery. Operation.—Enterorrhaphy suture; no drainage. Days in hospital.—Thirteen.

CASE X.—White man, twenty-two years old. Operation, hours after injury.—Three. Location of wound.—Upper left abdomen. Operative findings.—Wound of stomach; slight hæmorrhage. Operation.—Gastrorrhaphy; no drainage. Days in hospital.—Thirty.

CASE XI.—White woman, thirty-eight years old. Operation, hours after injury.—? Location of wound.—Left lower abdomen. Operative findings.—Penetrating wound; severe hæmorrhage; external wound. Operation.—Exploratory laparotomy; no drainage. Days in hospital.—Eighteen.

CASE XII.—White man, twenty-one years old. Operation, hours after injury.—? Location of wound.—Upper left abdomen; anterior; multiple. Operative findings.—Wound of stomach; diaphragm; pleura. Operation.—Gastrorrhaphy; suture diaphragm; drainage. Days in hospital.—Twenty.

CASE XIII.—White man, twenty-two years old. Operation, hours after injury.—? Location of wound.—Lower left abdomen. Operative findings.—Penetrating wound. Operation.—Exploratory laparotomy; no drainage. Complications.—Partial obstruction fifth day. Days in hospital.—Seventeen.

CASE XIV.—White man, twenty-two years old. Operation, hours after injury.—Eighteen. Location of wound.—Upper left abdomen; anterior. Operative findings.—Wound of diaphragm. Operation.—Exploratory laparotomy; suture diaphragm; no drainage. Days in hospital.—Fifteen.

CASE XV.—White man, twenty-five years old. Operation, hours after injury.—One. Location of wound.—Upper left abdomen, lateral. Operative findings.—Laceration of

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mesentery; moderate hæmorrhage. Operation.—Exploratory laparotomy; suture mesentery; drainage. Days in hospital.—Eleven.

CASE XVI.—White man, forty-seven years old. Operation, hours after injury.—Two. Location of wound.—Lower abdomen. Operative findings.—Laceration of mesentery; evisceration of small intestine and omentum; moderate hæmorrhage. Operation.—Repair mesentery; no drainage. Complications.—Pneumonia. Days in hospital.—Twenty-five.

CASE XVII.—White man, thirty-one years old. Operation, hours after injury.—Two. Location of wound.—Lower right abdomen; anterior. Operative findings.—Omentum protruding; no visceral injury. Operation.—Exploratory laparotomy; drainage. Complications.—Local peritonitis. Days in hospital.—Thirteen.

CASE XVIII.—White man, twenty-three years old. Operation, hours after injury.—? Location of wound.—Upper left abdomen; anterior. Operative findings.—Small puncture liver; slight hæmorrhage. Operation.—Exploratory laparotomy; suture liver; drainage. Days in hospital.—Twenty-three.

CASE XIX.—Colored man, fifty years old. Operation, hours after injury.—One and three-quarters. Location of wound.—Lower left abdomen; anterior. Operative findings.—Penetrating wound; small intestine protruding. Operation.—Exploratory laparotomy; drainage. Days in hospital.—Twenty.

CASE XX.—White man, twenty-two years old. Operation, hours after injury.—Three. Location of wound.—Upper right abdomen; anterior. Operative findings.—Four perforations large intestine; severe hæmorrhage. Operation.—Enterorrhaphy; irrigation N. S. S.; drainage. Days in hospital.—Twenty-eight.

CASE XXI.—White man, twenty years old. Operation, hours after injury.—One. Location of wound.—Lower left abdomen; lateral. Operative findings.—Penetrating wound; omentum protruding. Operation.—Exploratory laparotomy; drainage. Days in hospital.—Thirteen.

CASE XXII.—White man, twenty-six years old. Operation, hours after injury.—? Location of wound.—Abdomen. Operative findings.—Penetrating wound; slight hæmorrhage. Operation.—Exploratory laparotomy; drainage. Days in hospital.—Fourteen.

CASE XXIII.—Colored man, twenty-seven years old. Operation, hours after injury.—One. Location of wound.—Upper left abdomen; anterior. Operative findings.—Wound of stomach; laceration of omentum; moderate hæmorrhage. Operation.—Gastrorrhaphy; repair omentum; drainage. Complications.—Pulmonary collapse right lower lobe. Days in hospital.—Nineteen.

CASE XXIV.—Colored man, twenty-four years old. Operation, hours after injury.—One and one-half. Location of wound.—Lower left abdomen; anterior. Operative findings.—Penetrating wound. Operation.—Exploratory laparotomy; no drainage. Days in hospital.—Nine.

CASE XXV.—White man, thirty-five years old. Operation, hours after injury.—? Location of wound.—Upper left abdomen; chest. Operative findings.—Two perforations jejunum; multiple wounds mesentery; puncture left pleura; severe hæmorrhage. Operation.—Resection of jejunum with end-to-end anastomosis; drainage. Days in hospital.—Thirty-two.

CASE XXVI.—Colored man, twenty-four years old. Operation, hours after injury.—Four. Location of wound.—Upper left abdomen; anterior. Operative findings.—Penetrating wound; slight hæmorrhage. Operation.—Exploratory laparotomy; no drainage. Days in hospital.—Twelve.

CASE XXVII.—White man, twenty-eight years old. Operation, hours after injury.—One. Location of wound.—Upper and lower right abdomen. Operative findings.—Wound of bladder; slight hæmorrhage. Operation.—Suture bladder; drainage. Days in hospital.—Sixteen.

CASE XXVIII.—White man, twenty-five years old. Operation, hours after injury.—Five and one-half. Location of wound.—Lower right abdomen; anterior. Operative

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findings.—Penetrating wound; laceration of omentum; omentum protruding; moderate hæmorrhage. Operation.—Exploratory laparotomy; suture; ligation; no drainage. Days in hospital.—Fourteen.

CASE XXIX.—Colored man, forty-two years old. Operation, hours after injury.—Two and one-half. Location of wound.—Lower left abdomen; anterior. Operative findings.—One perforation small intestine; moderate hæmorrhage. Operation.—Enterorrhaphy; suture; drainage. Days in hospital.—Seventeen.

CASE XXX.—White man, twenty-six years old. Operation, hours after injury.—Two. Location of wound.—Upper right abdomen; anterior. Operative findings.—Penetrating wound. Operation.—Exploratory laparotomy; no drainage. Complications.—Infection of wound. Days in hospital.—Twenty.

CASE XXXI.—Colored man, forty-nine years old. Operation, hours after injury.—Two and one-half. Location of wound.—Anterior abdomen. Operative findings.—Penetrating wound; severe hæmorrhage from omentum. Operation.—Exploratory laparotomy; ligation; no drainage. Days in hospital.—Nineteen.

CASE XXXII.—Colored man, thirty-six years old. Operation, hours after injury.—One. Location of wound.—Upper left abdomen; posterior lateral. Operative findings.—Small intestine protruding through penetrating wound. Operation.—Exploratory laparotomy; no drainage. Days in hospital.—Nineteen.

CASE XXXIII.—White man, thirty-five years old. Operation, hours after injury.—Three-quarters. Location of wound.—Upper left abdomen; anterior. Operative findings.—Laceration of mesentery of small intestine. Operation.—Exploratory laparotomy; suture; no drainage. Days in hospital.—Fourteen.

CASE XXXIV.—White man, thirty-eight years old. Operation, hours after injury.—Two. Location of wound.—Upper left abdomen; anterior. Operative findings.—Severance of hypogastric vein; wound of mesentery; descending colon. Operation.—Exploratory laparotomy; ligation. Days in hospital.—Eighteen.

CASE XXXV.—White man, thirty-nine years old. Operation, hours after injury.—One. Location of wound.—Upper left abdomen; anterior. Operative findings.—Perforation of jejunum; laceration of mesentery; hæmorrhage. Operation.—Enterorrhaphy; suture; no drainage. Days in hospital.—Eighteen.

CASE XXXVI.—Colored man, twenty-six years old. Operation, hours after injury.—Two. Location of wound.—Upper left abdomen; anterior. Operative findings.—Penetrating wound of liver; moderate hæmorrhage. Operation.—Laparotomy; suture of liver; no drainage. Days in hospital.—Fourteen.

CASE XXXVII.—Colored man, ? years old. Operation, hours after injury.—One. Location of wound.—Lower right abdomen; anterior. Operative findings.—Penetrating wound. Operation.—Exploratory laparotomy; no drainage. Days in hospital.—Sixteen.

CASE XXXVIII.—Colored woman, fifty years old. Operation, hours after injury.—Three and one-half. Location of wound.—Left lateral abdomen (flank). Operative findings.—Penetrating wound; laceration mesentery; descending colon. Operation.—Exploratory laparotomy; ligation; drainage. Days in hospital.—Thirty.

CASE XXXIX.—Colored man, eighteen years old. Operation, hours after injury.—One. Location of wound.—Lower right abdomen; anterior. Operative findings.—Omentum protruding. Operation.—Omentum excised; no drainage. Days in hospital.—Thirteen.

CASE XL.—Colored man, thirty-five years old. Operation, hours after injury.—Fourteen. Location of wound. Lower left abdomen; anterior. Operative findings.—Penetrating wound; slight hæmorrhage. Operation.—Exploratory laparotomy; drainage. Complications.—Local peritonitis. Days in hospital.—Fourteen.

CASE XLI.—Colored man, thirty-five years old. Operation, hours after injury.—One. Location of wound.—Upper left abdomen; anterior. Operative findings.—Pene-

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trating wound; evisceration jejunum; slight hæmorrhage. Operation.—Exploratory laparotomy; ligation; no drainage. Days in hospital.—Seventeen.

CASE XLII.—White man, twenty-eight years old. Operation, hours after injury.—One. Location of wound.—Upper left abdomen; lateral (flank). Operative findings.—Two perforations small intestine; two of large intestine; laceration of mesentery; severe hæmorrhage. Operation.—Enterorrhaphy, with drainage. Days in hospital.—Thirty.

CASE XLIII.—Colored man, twenty-five years old. Operation, hours after injury.—Nine and one-half. Location of wound.—Upper left abdomen; anterior. Operative findings.—One perforation small intestine; laceration of mesentery; severe hæmorrhage. Operation.—Enterorrhaphy; suture; ligation; no drainage. Complications.—General peritonitis. Days in hospital.—Twenty-three.

CASE XLIV.—White man, forty years old. Operation, hours after injury.—One and one-half. Location of wound.—Upper and lower left abdomen; anterior. Operative findings.—Evisceration of omentum and small intestine. Operation.—Exploratory laparotomy; no drainage. Days in hospital.—Sixteen.

CASE XLV.—White man, thirty-two years old. Operation, hours after injury.—Seven. Location of wound.—Lower left abdomen; anterior. Operative findings.—Laceration peritoneal; coat of sigmoid; slight hæmorrhage. Operation.—Exploratory laparotomy; suture; no drainage. Days in hospital.—Seventeen.

CASE XLVI.—Colored man, thirty-four years old. Operation, hours after injury.—Two. Location of wound.—Lower left abdomen. Operative findings.—Penetrating wound; omentum protruding. Operation.—Exploratory laparotomy; with drainage. Complications.—Wound infection. Days in hospital.—Thirty-four.

CASE XLVII.—Colored man, thirty-five years old. Operation, hours after injury.—One and one-quarter. Location of wound.—Lower left abdomen. Operative findings.—One perforation small intestine; slight hæmorrhage; evisceration small intestine. Operation.—Enterorrhaphy; suture; with drainage. Days in hospital.—Eighteen.

CASE XLVIII.—Colored woman, twenty-three years old. Operation, hours after injury.—Eight. Location of wound.—Upper right abdomen; anterior. Operative findings.—Laceration of gastrocolic omentum; severe hæmorrhage. Operation.—Exploratory laparotomy; drainage. Complications.—Wound infection. Days in hospital.—Thirty-three.

CASE XLIX.—Colored man, thirty-one years old. Operation, hours after injury.—One. Location of wound.—Upper left abdomen; anterior. Operative findings.—Laceration mesentery; transverse colon; moderate hæmorrhage. Operation.—Exploratory laparotomy; ligation; drainage. Complications.—Wound infection. Days in hospital.—Nineteen.

CASE L.—Colored man, twenty-five years old. Operation, hours after injury.—Two. Location of wound.—Lower right abdomen; anterior. Operative findings.—One perforation small intestine; omentum protruding; slight hæmorrhage. Operation.—Enterorrhaphy; suture; drainage. Complications.—Local peritonitis. Days in hospital.—Twenty-seven.

CASE LI.—Colored woman, twenty-two years old. Operation, hours after injury.—One and one-half. Location of wound.—Upper right abdomen; anterior. Operative findings.—Wound of liver; severe hæmorrhage. Operation.—Exploratory laparotomy; pack; drainage. Days in hospital.—Fifteen.

CASE LII.—Colored man, ? years old. Operation, hours after injury.—Five. Location of wound.—Upper left abdomen. Operative findings.—Laceration of mesentery; moderate hæmorrhage. Operation.—Exploratory laparotomy; ligation; drainage. Complications.—Left pleurisy. Days in hospital.—Seventeen.

CASE LIII.—White man, thirty-two years old. Operation, hours after injury.—Two and one-half. Location of wound.—Upper left abdomen; anterior. Operative findings.—Penetrating wound; round ligament of liver severed. Operation.—Exploratory laparotomy; no drainage. Days in hospital.—Fifteen.

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CASE LIV.—Colored man, thirty-four years old. Operation, hours after injury.—Two. Location of wound.—Upper left abdomen; anterior. Operative findings.—Laceration of gall-bladder; omentum protruding; slight hæmorrhage. Operation.—Exploratory laparotomy; suture ligation with drainage. Days in hospital.—Eighteen.

CASE LV.—Colored man, thirty-nine years old. Operation, hours after injury.—Five. Location of wound.—Upper left abdomen; lateral. Operative findings.—Penetrating wound; severe hæmorrhage; laceration gastrocolic omentum; omentum protruding. Operation.—Exploratory laparotomy; ligation with drainage; reinfusion 500 cubic centimetres of blood. Complications.—Wound infection. Days in hospital.—Twenty-three.

CASE LVI.—Colored man, twenty-two years old. Operation, hours after injury.—One-half. Location of wound.—Lower left abdomen; anterior. Operative findings.—One perforation small intestine; slight hæmorrhage; omentum protruding. Operation.—Enterorrhaphy; no drainage. Days in hospital.—Eleven.

CASE LVII.—Colored female, twenty-eight years old. Operation, hours after injury.—Ten. Location of wound.—Upper left abdomen, from back. Operative findings.—One perforation large intestine; descending colon. Operation.—Enterorrhaphy, with drainage. Complications.—Wound infection. Days in hospital.—Twenty-three.

CASE LVIII.—Colored man, twenty-nine years old. Operation, hours after injury.—Two. Location of wound.—Upper left abdomen; posterior. Operative findings.—Laceration of spleen (slight) and diaphragm; slight hæmorrhage; omentum protruding. Operation.—Exploratory laparotomy; suture with drainage. Complications.—Wound rupture ninth day; resutured. Days in hospital.—Thirty-one.

CASE LIX.—Colored man, thirty-eight years old. Operation, hours after injury.—Four. Location of wound.—Upper left abdomen; anterior. Operative findings.—Wound of liver; pancreas (slight); severe hæmorrhage. Operation.—Exploratory laparotomy; packing with drainage. Days in hospital.—Seventeen.

CASE LX.—Colored man, twenty-five years old. Operation, hours after injury.—Twelve. Location of wound.—Upper left abdomen; anterior. Operative findings.—One perforation of anterior wall of stomach. Operation.—Gastrorrhaphy; suture with drainage. Complications.—Wound infection. Days in hospital.—Twenty-three.

Stab-wound Injuries—No Operation—Recovery

CASE I.—White man, thirty-five years old. Multiple stab wounds, penetrating, but probably no perforations. Refused operation. Left hospital in two days with signs of peritonitis still present. Readmitted to hospital three times during the next month without abdominal symptoms, but infection still present in shoulder wounds.

CASE II.—Colored man, thirty-six years old. Single stab wound, penetrating but probably no visceral injury. Refused operation. Apparently had local peritonitis which subsided. Left hospital in five days, earlier than advised; but in good condition.

CASE III.—Colored man, thirty-two years old. Multiple stab wounds. Penetrating wound right thoracic cavity, surgical emphysema (no effusion of consequence); penetrating wound upper abdomen without visceral injury; no peritonitis; no infection of wounds; no complications. Left the hospital in eleven days.

. Stab-wound Injuries—Operation—Death

CASE I.—Colored man, twenty-four years old. Operation, hours after injury.—One and three-quarters. Location of wound injury.—Lower right abdomen; anterior. Operative findings.—Two perforations small intestine; two of large intestine; severe hæmorrhage. Operation.—Enterorrhaphy; irrigation N. S. S.; drainage. Time and autopsy cause of death.—Fourteen hours; hæmorrhage; shock; early peritonitis.

CASE II.—Colored woman, fifty-seven years old. Operation, hours after injury.—Two. Location of wound injury.—Upper left abdomen. Operative findings.—Wound

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on under surface of liver; severe hæmorrhage. Operation.—Exploratory laparotomy; packing. Time and autopsy cause of death.—On table; hæmorrhage; shock.

CASE III.—White man, thirty-six years old. Operation, hours after injury.—Twenty-one. Location of wound injury.—Upper left abdomen; anterior. Operative findings.—One perforation of stomach; wound of diaphragm; moderate hæmorrhage. Operation.—Gastrorrhaphy; suture diaphragm. Complications.—Delirium tremens. Time and autopsy cause of death.—Four days; peritonitis; pneumonia; pleurisy; pericarditis.

CASE IV.—Colored man, twenty-one years old. Operation, hours after injury.—Three. Location of wound injury.—Lower left abdomen. Operative findings.—Wound of mesentery; severe hæmorrhage. Operation.—Repair mesentery; suture pack; drainage. Complications.—General peritonitis; lobar-broncho pneumonia. Time and autopsy cause of death.—Four days; general peritonitis; lobar and broncho pneumonia.

CASE V.—White man, thirty-nine years old. Operation, hours after injury.—? Location of wound injury.—Left mid-abdomen. Operative findings.—Six perforations descending colon; severe hæmorrhage. Operation.—Enterorrhaphy; drainage. Complications.—Wound infection. Time and autopsy cause of death.—Four days; peritonitis; pneumonia; leakage from site of repair.

CASE VI.—Colored man, twenty-nine years old. Operation, hours after injury.—Two and one-half. Location of wound injury.—Left lower abdomen; anterior; left chest; anterior. Operative findings.—No evidence of visceral injury or bleeding found first operation; vomiting seventh day; tenth day second operation; obstruction; intestinal leakage at site of obstruction; four days later third operation; intestinal obstruction; leakage fæces from wound; condition improved very much for six days; then gradually got worse; died fourteen days after third operation. Operation.—Exploratory laparotomy; no drainage; second operation, resection; end-to-end anastomosis; drainage; third operation, drainage. Complications.—Abdominal infection; obstruction; general peritonitis; fæcal fistula. Time and autopsy cause of death.—Twenty-eight days; general peritonitis and intestinal obstruction; left subphrenic abscess.

CASE VII.—White man, forty-seven years old. Operation, hours after injury.—One and three-quarters. Location of wound injury.—Upper right abdomen; anterior. Operative findings.—Wound of liver; moderate hæmorrhage. Operation.—Exploratory laparotomy; suture with drainage. Complications.—Meningitis. Time and autopsy cause of death.—Twenty-three days; peritonitis; subphrenic abscess; septic nephritis.

CASE VIII.—White man, seventy years old. Operation, hours after injury.—One. Location of wound injury.—Lower right abdomen; anterior. Operative findings.—Suicide; excision section small intestine; completely severed colon; severe hæmorrhage. Operation.—Fixation of severed ends of intestines to abdominal wall. Time and autopsy.—Three and one-half days; shock and peritonitis; no autopsy.

CASE IX.—White man, fifty years old. Operation, hours after injury.—Two. Location of wound injury.—Left abdomen; upper lateral. Operative findings.—Wound of spleen and stomach; profuse hæmorrhage; diaphragm injured. Operation.—Splenic pedicle clamped; packing. Time and autopsy cause of death.—On table; severe hæmorrhage before operation was concluded.

CASE X.—White man, twenty-nine years old. Operation, hours after injury.—Eight (refused early operation). Location of wound injury.—Upper left abdomen; anterior. Operative findings.—Injury to posterior wall of stomach; diaphragm; pleura; moderate hæmorrhage. Operation.—Gastrorrhaphy; suture with drainage. Complications.—Collapse of left lung; early peritonitis; pleurisy. Time and autopsy cause of death.—Fifteen hours; hæmorrhage; shock.

CASE XI.—Colored man, ? years old. Operation, hours after injury.—One. Location of wound injury.—Upper right abdomen; anterior. Operative findings.—Wound through edge of liver; severe hæmorrhage; laceration gastrohepatic omentum. Operation.—Exploratory laparotomy; three large packs with drainage. Time and autopsy

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cause of death.—Four hours; hæmorrhage; penetration right pleura; wound superior vena cava overlooked at operation.

CASE XII.—Colored man, thirty-five years old. Operation, hours after injury.—One and one-half. Location of wound injury.—Upper left abdomen; anterior. Operative findings.—Wound of stomach; severe hæmorrhage; second operation for rupture of wound with visceration of intestines. Operation.—First operation, gastrorrhaphy; no drainage; second operation second day, wound repair; drainage. Complications.—Ruptured wound; general peritonitis. Time and autopsy cause of death.—Four days; general peritonitis.

CASE XIII.—White man, twenty-six years old. Operation, hours after injury.—One to two. Location of wound injury.—Left abdomen; anterior. Operative findings.—One perforation small intestine; injury to mesenteric border of ileum; severe hæmorrhage. Operation.—Enterorrhaphy; no drainage; second day after operation drained for peritonitis. Complications.—General peritonitis. Time and autopsy cause of death.—Two days; general peritonitis; fulminating.

CASE XIV.—White man, forty-four years old. Operation, hours after injury.—One and one-half. Location of wound injury.—Right abdomen; multiple of chest and body (17 wounds). Operative findings.—One perforation of stomach; transverse colon; laceration of omentum; moderate hæmorrhage; wound of left lung. Operation.—Gastrorrhaphy; enterorrhaphy; repair omentum; drainage. Complications.—Delirium tremens. Time and autopsy cause of death.—Seven days; peritonitis; wounds of liver and left kidney overlooked.

CASE XV.—Colored man, sixty years old. Operation, hours after injury.—One. Location of wound injury.—Upper and lower right abdomen; anterior (multiple). Operative findings.—Laceration of liver; penetrating wounds; moderate hæmorrhage. Operation.—Laparotomy; packing liver wound (too tight). Complications.—Pulmonary œdema; biliary fistula. Time and autopsy cause of death.—Seven days; pneumonia; infection of liver wound; subphrenic abscess.

CASE XVI.—Colored woman, twenty-five years old. Operation, hours after injury.—Four and one-half. Location of wound injury.—Upper left abdomen; anterior. Operative findings.—Six perforations jejunum; one of transverse colon; moderate hæmorrhage. Operation.—Enterorrhaphy; ligation; suture; drainage. Complications.—Local peritonitis; pulmonary œdema. Time and autopsy cause of death.—Four days; hæmorrhage; shock; advanced pulmonary tuberculosis contributing cause.

CASE XVII.—White man, fifty-three years old. Operation, hours after injury.—Eighteen. Location of wound injury.—Lower left abdomen; anterior; multiple. Operative findings.—Multiple perforations small intestine and mesentery; one of mesosigmoid; moderate hæmorrhage. Operation.—Resection of fifteen inches ileum and lateral anastomosis; drainage. Time and autopsy cause of death.—Four days; septic peritonitis.

Stab-wound Injuries—No operation—Death

CASE I.—White man, forty years old. Multiple stab wounds of heart and abdomen; penetrating. Died two minutes after admission. No autopsy.

CASE II.—White man, forty-two years old. Single stab wound left upper abdomen. Had generalized œdema with cardiac decompensation. Suicide. Died in twenty hours. No autopsy.

CASE III.—Colored man, ? years old. Single stab wound left upper abdomen. Died immediately after admission. Autopsy showed clot in pericardium causing compression of heart; right side of right ventricle penetrated.

CASE IV.—Colored man, twenty-three years old. Single stab wound epigastrium. Signs of severe hæmorrhage; omentum protruding. Died in twenty minutes. No autopsy.

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The mesentery was injured in 17 cases (no associated injuries in 7)
 The omentum was injured in 6 cases (no associated injuries in 2)
 The stomach was injured in 6 cases (multiple—1)
 The small intestine was injured in 11 cases (multiple—3)
 The large intestine was injured in 3 cases (multiple—2)
 The urinary bladder was injured in 1 case
 The liver was injured in 3 cases
 The spleen was injured in 1 case (small wound)
 The pancreas was injured in 1 case (small wound)

Evisceration was noted in 17 instances { intestine..... 8
 stomach..... 1
 omentum..... 8

In 7 cases the pleural cavity was penetrated { unilateral..... 6
 bilateral..... 1
 The diaphragm was perforated in 5 cases.

Hæmorrhage was severe in 7 cases, moderate in 11, and slight in 16. In 26 there was no note as to hæmorrhage. Shock as a rule was not marked except when associated with considerable hæmorrhage. It was surprisingly slight in most of the evisceration cases. In several instances the patients had walked into the receiving ward with a part of their intestines resting in their clothes with but little evidence of shock. The operative procedure in this group was very simple.

A resection with end-to-end anastomosis was done in one case for multiple injuries to the jejunum and its mesentery. In 20 cases the wound was closed without drainage, including 14 without visceral injury, 3 stomach perforations, 2 small intestine perforations, and one liver wound. The complications included—wound infection, 7; rupture of wound and evisceration (ninth day), 1; partial obstruction, 1; pneumonia, 2; pulmonary collapse, 2; pleurisy, 1; subphrenic abscess, 1; and phlebitis, 1.

Three cases recovered without operation who suffered penetrating wounds. Two of these patients refused to have operations performed. The other one was admitted many hours after being stabbed without symptoms of visceral injury, and was treated conservatively. We do not believe that any of them suffered visceral damage.

Seventeen of the 77 cases operated upon died. Autopsies were performed on 15 cases (88 per cent.). There are a few outstanding features in this group. In 9 cases hæmorrhage was severe, and in 7 it was moderate in amount. Four deaths occurred within fifteen hours, and can be attributed directly to hæmorrhage and shock. Thirteen died within four days, and all severe hæmorrhage cases died within four days. In 2 cases resection of small intestine was done (one lateral and one end-to-end anastomosis). In four cases the abdomen was closed without drainage. At autopsy peritonitis was found in 11 cases, pneumonia in 3, and subphrenic abscess in three. Wounds of the liver and left kidney were overlooked at operation in a case suffering multiple penetrating wounds of chest and abdomen with perforations of stomach and colon. The cause of death was peritonitis on the

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seventh day. In one case leakage occurred after repair of six perforations of the colon. Death resulted on the fourth day from peritonitis.

		<i>Gunshot Wounds</i>
Total gunshot-wound cases.....	136	{ recoveries..... 61 { deaths..... 75
Cases operated upon	114	{ recoveries..... 59 { deaths..... 55
Cases not operated upon.....	22	{ recoveries..... 2 { deaths..... 20

A total mortality of 55.14 per cent. is shown in this group and an operative mortality of 48.2 per cent. In the group of operative recoveries of which there were 59, hæmorrhage was severe in 27, moderate in 12, slight in 12, and no note as to hæmorrhage in 8 cases. In 21 cases visceral injuries were single, and in 32 they were multiple.

GROUP II

Gunshot Wound Injuries—Operation—Recovery

CASE I.—Colored man, forty-two years old. Operation, hours after injury.—Two. Location of wound.—Upper left abdomen; anterior. Operative findings.—Wound of liver; severe hæmorrhage. Operation.—Packing wound; drainage. Days in hospital.—Thirty-four.

CASE II.—Colored man, twenty-seven years old. Operation, hours after injury.—One and one-quarter. Location of wound.—Lower left abdomen; anterior. Operative findings.—Two perforations sigmoid; moderate hæmorrhage. Operation.—Enterorrhaphy; suture; drainage. Complications—Wound infection. Days in hospital.—Eighteen.

CASE III.—Colored man, twenty-seven years old. Operation, hours after injury.—Three. Location of wound.—Lower left abdomen; anterior. Operative findings.—Wound of bladder; slight hæmorrhage. Operation.—Marsupialization with drainage. Days in hospital.—Fifty-nine.

CASE IV.—White man, seventy-three years old. Operation, hours after injury.—One and one-half. Location of wound.—Upper left abdomen; anterior. Operative findings.—Perforation of stomach; severe hæmorrhage. Operation.—Gastrorrhaphy; suture; drainage. Days in hospital.—Fifty-nine.

CASE V.—White man, nineteen years old. Operation, hours after injury.—One and one-half. Location of wound.—Mid-abdomen. Operative findings.—Two perforations jejunum; severe hæmorrhage. Operation.—Enterorrhaphy; suture; packing. Complications.—Pneumonia effusion. Days in hospital.—Forty.

CASE VI.—White woman, sixteen years old. Operation, hours after injury.—? Location of wound.—Right upper abdomen. Operative findings.—Wound of liver; severe hæmorrhage. Operation.—Packing wound. Days in hospital.—Fourteen.

CASE VII.—Colored man, twenty-six years old. Operation, hours after injury.—Three and one-half. Location of wound.—Lower left abdomen; posterior. Operative findings.—Wound right ureter. Operation.—Drainage. Complications.—Urinary fistula; posterior; healed spontaneously. Days in hospital.—Forty-four.

CASE VIII.—Colored woman, twenty-five years old. Operation, hours after injury.—Two. Location of wound.—Lower left abdomen; anterior. Operative findings.—Wound of liver; severe hæmorrhage. Operation.—Packing wound; drainage. Complications.—Liver abscess? drainage; fever five weeks. Days in hospital.—Seventy.

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CASE IX.—White man, twenty-one years old. Operation, hours after injury.—Two. Location of wound.—Upper left abdomen; anterior. Operative findings.—Wound of liver; moderate hæmorrhage. Operation.—Packing wound. Complications.—Pleurisy; pneumonia. Days in hospital.—Nineteen.

CASE X.—White woman, twenty-three years old. Operation, hours after injury.—One and one-half. Location of wound.—Upper right abdomen; anterior. Operative findings.—Wound of pancreas; one perforation of small intestine and one of stomach; moderate hæmorrhage. Operation.—Gastrorrhaphy; enterorrhaphy; suture; drainage. Complications.—Duodenal fistula; local peritonitis; fistula healed spontaneously. Days in hospital.—Ninety-two.

CASE XI.—White man, twenty-seven years old. Operation, hours after injury.—One. Location of wound.—Upper right abdomen; anterior. Operative findings.—Two perforations stomach; six perforations small intestine; one of transverse colon and one of rectum; moderate hæmorrhage. Operation.—Gastrorrhaphy; enterorrhaphy; irrigation with N. S. S., drainage. Days in hospital.—Twenty-five.

CASE XII.—White man, twenty-five years old. Operation, hours after injury.—Five. Location of wound.—Upper left abdomen; anterior. Operative findings.—Wound of diaphragm; pleura. Operation.—Laparotomy; no drainage. Days in hospital.—Twelve.

CASE XIII.—White man, twenty-two years old. Operation, hours after injury.—One to one and one-half. Location of wound.—Upper left abdomen; posterior. Operative findings.—Wound of liver and stomach; moderate hæmorrhage. Operation.—Gastrorrhaphy; drainage. Days in hospital.—Thirty.

CASE XIV.—White man, thirty-three years old. Operation, hours after injury.—? Location of wound.—Upper left abdomen; posterior. Operative findings.—Penetrating wound. Operation.—Laparotomy; no drainage. Days in hospital.—Nineteen.

CASE XV.—White girl, twelve years old. Operation, hours after injury.—? Location of wound.—Lower abdomen. Operative findings.—Two perforations small intestine; slight hæmorrhage. Operation.—Enterorrhaphy; drainage. Days in hospital.—Fifteen.

CASE XVI.—White man, forty-three years old. Operation, hours after injury.—Twenty-seven. Location of wound.—Upper right abdomen; two wounds. Operative findings.—One perforation of cæcum; moderate hæmorrhage. Operation.—Enterorrhaphy; drainage. Days in hospital.—Twenty-three.

CASE XVII.—Colored man, twenty-eight years old. Operation, hours after injury.—? Location of wound.—Left upper abdomen. Operative findings.—Perforation of spleen; severe hæmorrhage. Operation.—Splenectomy; gauze pack; drainage; transfusion. Complications.—On twenty-fifth day onset of severe tertian malarial infection; plasmodia recovered; responded to quinine therapy. Days in hospital.—Forty-five.

CASE XVIII.—Colored man, forty years old. Operation, hours after injury.—Two to three. Location of wound.—Left upper abdomen. Operative findings.—No visceral injury; penetrating wound. Operation.—Exploratory laparotomy; no visceral injury. Complications.—Hemothorax; thorotomy; drainage. Days in hospital.—Sixteen.

CASE XIX.—White boy, five years old. Operation, hours after injury.—? Location of wound.—Upper right abdomen; anterior. Operative findings.—Wound of liver; severe hæmorrhage. Operation.—Packing wound; drainage. Complications.—Biliary fistula; subphrenic abscess. Days in hospital.—Thirty-nine.

CASE XX.—Colored man, thirty-four years old. Operation, hours after injury.—One and one-half. Location of wound.—Upper left abdomen; posterior. Operative findings.—Wound left kidney; severe hæmorrhage. Operation.—Nephrectomy; drainage. Complications.—Wound infection. Days in hospital.—Twenty-five.

CASE XXI.—White man, thirty-five years old. Operation, hours after injury.—One. Location of wound.—Upper right abdomen; lateral. Operative findings.—Wound of liver; anterior surface; severe hæmorrhage. Operation.—Packing of wound with vaseline gauze. Days in hospital.—One hundred and two.

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CASE XXII.—White man, twenty-three years old. Operation, hours after injury.—Two and three-quarters. Location of wound.—Lower abdomen; anterior. Operative findings.—Injury to veins in pelvis; severe hæmorrhage. Operation.—Packing in pelvis; drainage. Days in hospital.—Seventeen.

CASE XXIII.—White man, eighteen years old. Operation, hours after injury.—Twenty-six. Location of wound.—Upper right abdomen. Operative findings.—Two perforations small intestine; severe hæmorrhage; laceration mesentery. Operation.—Enterorrhaphy; drainage; suture. Complications.—Influenza. Days in hospital.—Thirty-one.

CASE XXIV.—Colored man, thirty years old. Operation, hours after injury.—Two. Location of wound.—Lower left abdomen; anterior. Operative findings.—Large hæmata in spermatic cord; moderate hæmorrhage. Operation.—Drainage. Days in hospital.—Fourteen.

CASE XXV.—White man, thirty-eight years old. Operation, hours after injury.—One. Location of wound. Lower abdomen. Operative findings.—Thirteen perforations small intestine; one of bladder; moderate hæmorrhage. Operation.—Enterorrhaphy; lateral anastomosis without resection; suture; drainage. Days in hospital.—Forty-four.

CASE XXVI.—Colored man, twenty-five years old. Operation, hours after injury.—One and one-half. Location of wound.—Upper right abdomen; lateral. Operative findings.—Wound of liver and diaphragm; severe hæmorrhage. Operation.—Packing liver wound; drainage. Complications.—Wound infection. Days in hospital.—Twenty-three.

CASE XXVII.—White man, nineteen years old. Operation, hours after injury.—Two. Location of wound.—Lower abdomen from back. Operative findings.—Laceration gastro-colic omentum; injury lumbar plexus; severe hæmorrhage. Operation.—Suture; no drainage. Complications.—Paralysis left foot; wound infection; general peritonitis. Days in hospital.—Forty-three.

CASE XXVIII.—White man, thirty-four years old. Operation, hours after injury.—One and three-quarters. Location of wound.—Upper right abdomen from back. Operative findings.—Wound right lobe liver; right kidney; severe hæmorrhage. Operation.—Packing; drainage; suture. Days in hospital.—Twenty.

CASE XXIX.—White man, twenty-two years old. Operation, hours after injury.—Two. Location of wound.—Upper right, left abdomen; anterior. Operative findings.—Wound of liver and stomach; severe hæmorrhage. Operation.—Gastrorrhaphy; packing. Days in hospital.—Twenty-five.

CASE XXX.—Colored man, forty-one years old. Operation, hours after injury.—? Location of wound.—Lower left abdomen; anterior. Operative findings.—Four perforations small intestine; thrombosis of veins; mesentery. Operation.—Resection with lateral anastomosis; wound resutured sixth day; drainage. Complications.—General peritonitis. Days in hospital.—Thirty-four.

CASE XXXI.—White girl, twelve years old. Operation, hours after injury.—One. Location of wound.—Upper abdomen. Operative findings.—Wound of liver; spleen; stomach. Operation.—Suture; gauze pack; gastrorrhaphy; drainage. Days in hospital.—Twenty-six.

CASE XXXII.—White man, twenty-seven years old. Operation, hours after injury.—One and one-half. Location of wound.—Upper abdomen; posterior; left side. Operative findings.—Upper edge of spleen nicked; slight hæmorrhage. Operation.—Packing vaseline gauze; drainage. Complications.—Pleurisy. Days in hospital.—Thirteen.

CASE XXXIII.—White man, thirty-two years old. Operation, hours after injury.—One. Location of wound.—Lower left abdomen; anterior. Operative findings.—Six perforations small intestine; one of sigmoid; several perforations omentum; severe hæmorrhage. Operation.—Enterorrhaphy; ligation; resection ileum; end-to-end anastomosis; no drainage. Complications.—General peritonitis; wound infections. Days in hospital.—Twenty-eight.

CASE XXXIV.—White man, eighteen years old. Operation, hours after injury.—?

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Location of wound.—Upper left abdomen; posterior. Operative findings.—One perforation of stomach; four of jejunum; slight hæmorrhage. Operation.—Gastrorrhaphy; enterorrhaphy; suture ligation; drainage. Complications.—Wound infection. Days in hospital.—Twenty-six.

CASE XXXV.—White man, forty years old. Operation, hours after injury.—? Location of wound.—Upper right abdomen; anterior. Operative findings.—Wound of liver; diaphragm; pleura; severe hæmorrhage. Operation.—Pack liver wound; drainage. Complications.—Subphrenic abscess; hemothorax. Days in hospital.—Sixty-six.

CASE XXXVI.—White man, thirty-eight years old. Operation, hours after injury.—One. Location of wound.—Upper right abdomen; anterior. Operative findings.—Wound of liver; diaphragm; pleura; moderate hæmorrhage. Operation.—Packing; drainage. Complications.—Pneumothorax. Days in hospital.—Eighteen.

CASE XXXVII.—Colored man, twenty-seven years old. Operation, hours after injury.—Three and one-half. Location of wound.—Upper left abdomen; lateral; flank. Operative findings.—Three perforations sigmoid; three of mesentery; moderate hæmorrhage. Operation.—Suture; enterorrhaphy; drainage. Complications.—Slight local peritonitis. Days in hospital.—Twenty-eight.

CASE XXXVIII.—White man, forty-one years old. Operation, hours after injury.—Five. Location of wound.—Lower left abdomen; anterior. Operative findings.—Nine perforations small intestine; severe hæmorrhage; laceration mesentery. Operation.—Enterorrhaphy; drainage; suture; ligation. Complications.—Wound infections. Days in hospital.—Twenty-four.

CASE XXXIX.—White man, forty-four years old. Operation, hours after injury.—One. Location of wound.—Upper right abdomen; anterior. Operative findings.—Penetrating wound of abdomen; slight hæmorrhage. Operation.—Exploratory laparotomy; no drainage. Complications.—Fracture right ileum. Days in hospital.—Seventeen.

CASE XL.—White man, twenty-six years old. Operation, hours after injury.—One. Location of wound.—Upper right abdomen; anterior. Operative findings.—Wound of liver; severe hæmorrhage. Operation.—Packing; drainage. Complications.—Wound infection; bronchopneumonia. Days in hospital.—Forty-five.

CASE XLI.—White boy, fifteen years old. Operation, hours after injury.—One. Location of wound.—Lower left abdomen; anterior. Operative findings.—Eight perforations of ileum. Operation.—Resection ileum; end-to-end anastomosis; no drainage. Complications.—Wound infection. Days in hospital.—Twenty-five.

CASE XLII.—White man, twenty-eight years old. Operation, hours after injury.—One and one-half. Location of wound.—Upper right abdomen; anterior. Operative findings.—Wound of liver; slight hæmorrhage. Operation.—Packing liver wound; drainage. Days in hospital.—Sixteen.

CASE XLIII.—White boy, fourteen years old. Operation, hours after injury.—? Location of wound.—Upper right abdomen; anterior. Operative findings.—Perforation of small intestine; laceration mesentery; ascending colon; retroperitoneal hematoma; slight hæmorrhage. Operation.—Enterorrhaphy; suture; drainage. Days in hospital.—Eighteen.

CASE XLIV.—Colored man, forty-one years old. Operation, hours after injury.—One. Location of wound.—Upper right abdomen; lateral. Operative findings.—Wound of liver; slight hæmorrhage. Operation.—Packing liver wound; drainage. Complications.—Fracture eleventh and twelfth ribs. Days in hospital.—Twenty-two.

CASE XLV.—Colored man, twenty-five years old. Operation, hours after injury.—Thirty-six. Location of wound.—Upper right buttock. Operative findings.—Wound of bladder. Operation.—Exploratory laparotomy; drainage; second operation thirty days later; bullet removed from bladder through suprapubic wound after localization by cystoscope. Days in hospital.—Forty-three.

CASE XLVI.—Colored man, twenty-four years old. Operation, hours after injury.—Two. Location of wound.—Upper right abdomen; lateral. Operative findings.—Large

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jagged wound of liver; severe hæmorrhage. Operation.—Packing wound; drainage. Complications.—Wound infection; drained bile. Days in hospital.—Thirty.

CASE XLVII.—White man, twenty-seven years old. Operation, hours after injury.—? Location of wound.—Upper right and left abdomen. Operative findings.—Wound of left kidney; retroperitoneal hematoma; moderate hæmorrhage. Operation.—Exploratory laparotomy; suture of kidney. Days in hospital.—Twenty-four.

CASE XLVIII.—Colored man, thirty-one years old. Operation, hours after injury.—One and one-quarter. Location of wound.—Upper right abdomen; anterior. Operative findings.—Wound of liver; moderate hæmorrhage. Operation.—Packing; drainage; reinfusion or replacement of 300 cubic centimetres blood. Complications.—Pneumonia. Days in hospital.—Forty.

CASE XLIX.—White man, twenty-nine years old. Operation, hours after injury.—One. Location of wound.—Right lateral abdomen; flank. Operative findings.—Nine perforations ileum and jejunum; injury to mesentery of ascending colon; severe hæmorrhage. Operation.—Enterorrhaphy; suture; drainage. Complications.—Fracture head of left humerus. Days in hospital.—Twenty-five.

CASE L.—Colored woman, thirty years old. Operation, hours after injury.—Ten (refused early operation). Location of wound.—Lower right abdomen; anterior. Operative findings.—No visceral injury; slight hæmorrhage. Operation.—Exploratory laparotomy; X-ray disclosed bullet lodged in uterus. Days in hospital.—Twenty-three.

CASE LI.—Colored man, twenty-two years old. Operation, hours after injury.—? Location of wound.—Upper right abdomen. Operative findings.—Ten perforations of small intestine; severe hæmorrhage; injury to mesentery. Operation.—Enterorrhaphy. Days in hospital.—Twenty-six.

CASE LII.—White man, nineteen years old. Operation, hours after injury.—One. Location of wound.—Upper right abdomen; lateral. Operative findings.—Wound of liver; two perforations of stomach; injury to mesentery; moderate hæmorrhage. Operation.—Gastrorrhaphy; suture; packing liver wound; drainage. Complications.—Wound infection. Days in hospital.—Thirty-two.

CASE LIII.—White man, twenty-five years old. Operation, hours after injury.—Fourteen and one-half. Location of wound.—Upper right abdomen; anterior. Operative findings.—Wound of liver and diaphragm; severe hæmorrhage. Operation.—Packing liver wound; drainage; laparotomy. Days in hospital.—Twenty-two.

CASE LIV.—Colored woman, twenty-four years old. Operation, hours after injury.—Twenty-one. Location of wound.—Lower abdomen; anterior. Operative findings.—Wound of bladder. Operation.—Exploratory laparotomy; suture; drainage. Days in hospital.—Forty-three.

CASE LV.—Colored man, twenty-three years old. Operation, hours after injury.—One and one-half. Location of wound.—Upper left abdomen; anterior. Operative findings.—Nine perforations of small intestine; ileum; slight hæmorrhage. Operation.—Enterorrhaphy drainage. Days in hospital.—Fourteen.

CASE LVI.—White boy, thirteen years old. Operation, hours after injury.—One and one-quarter. Location of wound.—Upper left abdomen; anterior. Operative findings.—Wound of liver; contusions small intestines; two perforations transverse colon; slight hæmorrhage. Operation.—Enterorrhaphy; drainage; suture. Days in hospital.—Thirty.

CASE LVII.—White boy, eight years old. Operation, hours after injury.—One and one-quarter. Location of wound.—Upper abdomen; anterior. Operative findings.—Wound of liver; pancreas; two perforations of stomach; severe hæmorrhage. Operation.—Gastrorrhaphy; pack liver wound; drainage. Days in hospital.—Forty-four.

CASE LVIII.—White woman, twenty-six years old. Operation, hours after injury.—Four and three-quarters. Location of wound.—Lower abdomen; posterior. Operative findings.—Two perforations small intestine; two of large intestine; slight hæmorrhage;

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laceration left ovary. Operation.—Enterorrhaphy; suture; drainage. Days in hospital.—Twenty-seven.

CASE LIX.—White man, thirty years old. Operation, hours after injury.—One and one-half. Location of wound.—Upper left abdomen; anterior. Operative findings.—Ten perforations small intestine; two of large intestine; severe hæmorrhage. Operation.—Enterorrhaphy; drainage; suture; transfusion. Days in hospital.—Twenty-five.

Gunshot Wound Injuries—No Operation—Recovery

CASE I.—White man, thirty-eight years old. Multiple bullet wounds. Admitted with signs of hæmorrhage; conservative treatment instituted; condition steadily improved. Probably wound of spleen with no other visceral injuries. Recovery, thirty-eight days.

CASE II.—White man, thirty-one years old. Single wound upper abdomen. No signs of perforation on admission; vomited blood on third day; condition had improved so much that conservative treatment was continued. Probably wound of stomach.

Gunshot-wound Injuries—Operation—Death

CASE I.—White man, twenty-eight years old. Operation, hours after injury.—One and one-quarter. Location of wound.—Upper right abdomen; anterior. Operative findings.—Wound of liver; diaphragm and pleura; severe hæmorrhage. Operation.—Exploratory laparotomy; packing; drainage; irrigation N. S. S. Time and autopsy cause of death.—Twenty-seven hours; hemothorax; hæmorrhage; early peritonitis.

CASE II.—White man, forty-three years old. Operation, hours after injury.—Twelve. Location of wound.—Upper left abdomen; anterior. Operative findings.—Wound of liver; two perforations of stomach; three of small intestine; severe hæmorrhage. Operation.—Gastrorrhaphy; enterorrhaphy; suture; packing; irrigation N. S. S.; drainage. Time and cause of death.—Forty-six days; subphrenic abscess; no autopsy.

CASE III.—White boy, four years old. Operation, hours after injury.—One and one-quarter. Location of wound.—Lower right abdomen; anterior. Operative findings.—Eleven perforations of small intestine; moderate hæmorrhage. Operation.—Enterorrhaphy; irrigation N. S. S.; drainage. Time and autopsy cause of death.—Thirty-six hours; early peritonitis; acute dilatation of heart.

CASE IV.—White man, twenty-six years old. Operation, hours after injury.—One. Location of wound.—Upper right abdomen; lateral. Operative findings.—Wound of liver and duodenum; injury to transverse mesocolon; moderate hæmorrhage. Operation.—Enterorrhaphy; suture; drainage. Complication.—General peritonitis. Time and autopsy cause of death.—Thirteen days; right subphrenic abscess; peritonitis; duodenal repairs not holding; gangrene and sloughing of retroperitoneal structures; gas-bacillus infection?

CASE V.—White man, twenty-one years old. Operation, hours after injury.—Eighteen. Location of wound.—Upper right abdomen; lateral. Operative findings.—Wound of liver; two perforations of stomach; severe hæmorrhage; injury to diaphragm. Operation.—Gastrorrhaphy; drainage. Time and autopsy cause of death.—Two hours after operation; hæmorrhage and shock.

CASE VI.—White man, thirty years old. Operation, hours after injury.—One and one-half. Location of wound.—Upper right abdomen; anterior. Operative findings.—Wound of liver, diaphragm and pleura; abdomen filled with blood; severe hæmorrhage. Operation.—Exploratory laparotomy; packing; drainage. Time and autopsy cause of death.—Nine hours; hæmorrhage and shock; no autopsy.

CASE VII.—Colored woman, twenty-four years old. Operation, hours after injury.—Two. Location of wound.—Upper left abdomen; lateral. Operative findings.—Two perforations of diaphragm; pleura; lungs; bleeding at root of mesentery into lesser peritoneal cavity. Operation.—Exploratory laparotomy; packing; drainage. Complica-

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tion.—Local peritonitis. Time and autopsy cause of death.—Twenty-four days; sub-phrenic abscess; perforation of posterior wall of stomach and liver overlooked; sepsis.

CASE VIII.—Colored man, twenty-four years old. Operation, hours after injury.—Two. Location of wound.—Upper left abdomen; lateral. Operative findings.—Two perforations of stomach; two of small intestine; two of ascending colon; severe hæmorrhage. Operation.—Gastrorrhaphy; enterorrhaphy; suture; ligation; drainage. Time and autopsy cause of death.—Twelve hours; hæmorrhage and shock.

CASE IX.—White woman, forty years old. Operation, hours after injury.—One and three-quarters. Location of wound.—Lower right abdomen; lateral. Operative findings.—Wound of liver; moderate hæmorrhage. Operation.—Exploratory laparotomy; suture. Complication.—Early peritonitis. Time and autopsy cause of death.—Two and one-half days; hæmorrhage; peritonitis; chronic nephritis.

CASE X.—Colored man, thirty-two years old. Operation, hours after injury.—Two. Location of wound.—Upper right abdomen; anterior. Operative findings.—Thirteen perforations small intestine; two of large intestine; lacerations mesentery; moderate hæmorrhage. Operation.—Enterorrhaphy; suture; drainage; irrigation N. S. S. Time and autopsy cause of death.—Two and one-half days; hæmorrhage; peritonitis; chronic alcoholic nephritis.

CASE XI.—White man, thirty-two years old. Operation, hours after injury.—Two. Location of wound.—Upper right abdomen; lateral. Operative findings.—Perforating wound of liver; severe hæmorrhage; cavity filled with blood. Operation.—Exploratory laparotomy; packing; drainage. Time and autopsy cause of death.—Forty hours; profuse hæmorrhage; shock; early peritonitis. One perforation stomach; one of spleen; two of diaphragm overlooked.

CASE XII.—White man, thirty-five years old. Operation, hours after injury.—Two. Location of wound.—Upper right abdomen; anterior. Operative findings.—Eleven perforations of small intestine; severe hæmorrhage. Operation.—Enterorrhaphy; drainage. Time and autopsy cause of death.—Twenty-three hours; rapid peritonitis; hæmorrhage.

CASE XIII.—White man, fifty years old. Operation, hours after injury.—Three-quarters. Location of wound.—Upper right abdomen; anterior. Operative findings.—Wound of liver; two perforations stomach through pylorus; laceration of mesentery; wound of pancreas; severe hæmorrhage. Operation.—Gastrorrhaphy; packing; drainage. Time and autopsy cause of death.—Nine hours; hæmorrhage; shock.

CASE XIV.—Colored man, forty-five years old. Operation, hours after injury.—One. Location of wound.—Upper left abdomen; anterior. Operative findings.—Wound of liver and diaphragm; severe hæmorrhage; probable injury to spinal cord. Operation.—Exploratory laparotomy; packing; drainage. Complications.—Retention of urine; incontinence of fæces; anæsthesia and paralysis both legs to knee. Time and autopsy cause of death.—Sixteen days; peritonitis; urinary-tract sepsis; injury to pancreas overlooked.

CASE XV.—White woman, twenty-nine years old. Operation, hours after injury.—? Location of wound.—Upper abdomen. Operative findings.—Eleven perforations to small intestine; injury to mesentery; severe hæmorrhage. Operation.—Enterorrhaphy; drainage. Time and autopsy cause of death.—Fourteen hours; hæmorrhage; shock.

CASE XVI.—White man, twenty-two years old. Operation, hours after injury.—One and one-half. Location of wound.—Anterior abdomen through umbilicus. Operative findings.—Two perforations small intestine; moderate hæmorrhage. Operation.—Enterorrhaphy; suture; drainage. Time and autopsy cause of death.—Thirty-two hours; hæmorrhage; rapid peritonitis.

CASE XVII.—Colored man, twenty-one years old. Operation, hours after injury.—Two. Location of wound.—Lower left abdomen; anterior. Operative findings.—Six perforations small intestine; laceration of mesentery; severe hæmorrhage. Operation.—Enterorrhaphy; suture; drainage. Time and autopsy cause of death.—Five days; general peritonitis; retroperitoneal hæmorrhage.

CASE XVIII.—White man, twenty-four years old. Operation, hours after injury.—?

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Location of wound.—Anterior abdomen. Operative findings.—Six perforations small intestine; one of mesentery; severe hæmorrhage. Operation.—Enterorrhaphy; suture; drainage; irrigation N. S. S. Complication.—General peritonitis. Time and autopsy cause of death.—Eight days; general peritonitis; secondary pericarditis.

CASE XIX.—White man, thirty-two years old. Operation, hours after injury.—Two. Location of wound.—Lower right abdomen; lateral. Operative findings.—Five perforations small intestine; two of cæcum; hematoma root of mesentery; laceration right external iliac vessels; severe hæmorrhage. Operation.—Enterorrhaphy; suture; drainage with vaseline gauze. Time and autopsy cause of death.—Two hours after operation; hæmorrhage; shock.

CASE XX.—Colored man, thirty-eight years old. Operation, hours after injury.—One and one-half to two. Location of wound.—Lower left abdomen; anterior. Operative findings.—Seven perforations small intestine; injury of mesentery; severe hæmorrhage; perforation external iliac vein. Operation.—Enterorrhaphy; resection and lateral anastomosis; suture; ligation; drainage. Time and autopsy cause of death.—Four hours; hæmorrhage; shock.

CASE XXI.—Woman, twenty-four years old. Operation, hours after injury.—? Location of wound.—Upper left abdomen; anterior; right chest; posterior. Operative findings.—Two perforations jejunum; one of transverse colon; one of ascending colon; wound of diaphragm; right lung; moderate hæmorrhage. Operation.—Enterorrhaphy; suture, drainage with vaseline gauze. Complications.—General peritonitis; purulent drainage from wound. Time and autopsy cause of death.—Forty-eight hours; hæmorrhage; peritonitis; pneumothorax; leakage colon sutures.

CASE XXII.—White woman, nineteen years old. Operation, hours after injury.—One and one-half. Location of wound.—Upper right abdomen; anterior. Operative findings.—Wound of liver and diaphragm; severe hæmorrhage. Operation.—Exploratory laparotomy; packing; drainage; transfusion. Time and autopsy cause of death.—Twelve hours; hæmorrhage; shock; no autopsy.

CASE XXIII.—White man, twenty-six years old. Operation, hours after injury.—One and three-quarters. Location of wound.—Upper right abdomen; lateral. Operative findings.—Wound of liver; severe hæmorrhage. Operation.—Exploratory laparotomy; packing; drainage. Time and autopsy cause of death.—Twenty-six hours; hæmorrhage; shock; hemopneumothorax. Wound of right kidney, diaphragm and right lung overlooked.

CASE XXIV.—White man, thirty-nine years old. Operation, hours after injury.—? Location of wound.—Upper left abdomen; anterior; left chest; anterior. Operative findings.—Two perforations small intestine; omentum perforated several places; severe hæmorrhage; wound of diaphragm; left lung. Operation.—Enterorrhaphy; ligation; drainage. Time and autopsy cause of death.—Three and one-half hours after operation; hæmorrhage; shock. Wounds in small intestine overlooked.

CASE XXV.—Colored man, forty-three years old. Operation, hours after injury.—Twelve. Location of wound.—Left abdomen; anterior. Operative findings.—One perforation of stomach near cardia (anterior wall); wound of diaphragm; left lung; wound in omentum. Operation.—Gastrorrhaphy; suture of omentum; drainage lesser peritoneal cavity. Time and autopsy cause of death.—Twelve hours; hæmorrhage; shock. Posterior wall stomach, wound of spleen, left kidney all overlooked.

CASE XXVI.—White man, fifty-two years old. Operation, hours after injury.—One and three-quarters. Location of wound.—Upper left abdomen, lateral. Operative findings.—Wound of liver; two perforations of stomach; severe hæmorrhage. Operation.—Gastrorrhaphy; suture; packing; drainage. Complication.—Local peritonitis. Time and autopsy cause of death.—Forty-two hours; peritonitis; hæmorrhage; pneumonia.

CASE XXVII.—White man, twenty-seven years old. Operation, hours after injury.—? Location of wound.—Upper left abdomen; lateral. Operative findings.—

Wound of pancreas; two perforations of stomach; two of small intestine; severe hæmorrhage. Operation.—Gastrorrhaphy; enterorrhaphy; drainage. Time and autopsy cause of death.—Twelve hours after operation; pulmonary œdema; hæmorrhage; shock. Wound of liver and left kidney overlooked.

CASE XXVIII.—White man, twenty-two years old. Operation, hours after injury.—? Location of wound.—Upper left abdomen from back. Operative findings.—No visceral injury; wound of aorta. Operation.—Exploratory laparotomy; control of hæmorrhage with clamps; drainage. Time and autopsy cause of death.—Eight hours; hæmorrhage; shock.

CASE XXIX.—Colored man, forty-two years old. Operation, hour after injury.—One. Location of wound.—Lower right abdomen; lateral; multiple. Operative findings.—Two perforations stomach; two of jejunum; severe hæmorrhage. Operation.—Gastrorrhaphy; enterorrhaphy; suture; drainage. Time and autopsy cause of death.—Three days; hæmorrhage; pneumonia; no autopsy.

CASE XXX.—Colored man, thirty-eight years old. Operation, hour after injury.—One. Location of wound.—Upper left abdomen; lateral to right. Operative findings.—Wound of liver; gall-bladder; five perforations small intestine; two of transverse colon; severe hæmorrhage. Operation.—Enterorrhaphy; packing; drainage. Complication.—Peritonitis. Time and autopsy cause of death.—Five days; peritonitis; hæmorrhage; gall-bladder; sutures leaking.

CASE XXXI.—White man, thirty-eight years old. Operation, hours after injury.—One. Location of wound.—Upper left abdomen, anterior. Operative findings.—Wound of left kidney; two perforations stomach; injury to mesentery; severe hæmorrhage. Operation.—Nephrectomy, gastrorrhaphy; drainage; suture; ligation; transfusion. Time and autopsy cause of death.—One day; hæmorrhage; shock. Wound to pancreas overlooked. Condition critical at operation.

CASE XXXII.—Colored man, thirty-seven years old. Operation, hours after injury.—One and one-quarter. Location of wound.—Upper right abdomen; anterior. Operative findings.—Four perforations ileum; three of cæcum; slight hæmorrhage. Operation.—Enterorrhaphy; suture; drainage. Complication.—General peritonitis. Time and autopsy cause of death.—Five days; hæmorrhage; general peritonitis.

CASE XXXIII.—Colored man, thirty-eight years old. Operation, hours after injury.—One and three-quarters. Location of wound.—Upper left abdomen. Operative findings.—Two perforations jejunum; one of ileum; three of descending colon at mesenteric border; slight hæmorrhage. Operation.—Enterorrhaphy; suture; drainage. Time and autopsy cause of death.—Four hours; hæmorrhage; alcoholism; shock.

CASE XXXIV.—Colored man, thirty-three years old. Operation, hours after injury.—One and one-half. Location of wound.—Upper right abdomen; anterior; multiple. Operative findings.—Four perforations small intestine one of cæcum; two descending colon; several of mesentery; two of omentum; severe hæmorrhage. Operation.—Enterorrhaphy; resection small intestine; lateral anastomosis; cecostomy; suture; ligation; drainage. Time and autopsy cause of death.—thirty-six hours; hæmorrhage; shock; peritonitis.

CASE XXXV.—White man, forty years old. Operation, hours after injury.—Twenty-seven. Location of wound.—Upper right abdomen, lateral from back. Operative findings.—Severe wound of liver; four perforations of mesentery; severe hæmorrhage. Operation.—Laparotomy; packing; drainage. Complications.—Considerable wound bleeding on coughing. Time and autopsy cause of death.—twelve hours; hæmorrhage; shock; early peritonitis. Wound of duodenum overlooked.

CASE XXXVI.—White woman, twenty-five years old. Operation, hours after injury.—Four. Location of wound.—Lower abdomen; right chest. Operative findings.—Wound of liver; two perforations stomach; four of transverse colon; severe hæmorrhage. Operation.—Gastrorrhaphy; enterorrhaphy; suture; transfusion. Complication.—Cystitis;

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nephritis; hemothorax. Time and autopsy cause of death.—five days; septicemia? hæmorrhage; no autopsy.

CASE XXXVII.—White woman, forty-nine years old. Operation, hours after injury.—?. Location of wound.—Right abdomen; lateral; right chest. Operative findings.—Perforation of uterus; four of small intestine; four of large; severe hæmorrhage; wound of bladder and pleura. Operation.—Enterorrhaphy; suture; drainage. Time and autopsy cause of death.—ten hours; hæmorrhage; shock.

CASE XXXVIII.—White man, seventeen years old. Operation, hours after injury.—Eight? Location of wound.—Upper right abdomen; anterior. Operative findings.—Wound of liver; moderate hæmorrhage. Operation.—Laparotomy; suture; ligation; drainage. Complication.—Wound infected; bronchopneumonia; pleural effusion. Time and autopsy cause of death.—Twenty-one days; liver abscess; pneumonia; pleurisy; septicemia.

CASE XXXIX.—White man, twenty-eight years old. Operation, hours after injury.—Two. Location of wound.—Upper left abdomen; lateral; left upper abdomen; posterior. Operative findings.—Wound of liver; left kidney; two perforations stomach; wound of diaphragm; wound of lung; severe hæmorrhage. Operation.—Gastrorrhaphy; suture; drainage. Complication.—Rupture of wound. Time and autopsy cause of death.—Eighteen hours; hæmorrhage; shock; early peritonitis.

CASE XL.—Colored man, twenty-four years old. Operation, hour after injury.—One. Location of wound.—Right abdomen; posterior; left chest. Operative findings.—Wound of liver; right kidney; right lung; diaphragm; severe hæmorrhage. Operation.—Laparotomy; packing; drainage; transfusion. Time and autopsy cause of death.—Twenty-four hours; early sepsis; hæmorrhage, shock.

CASE XLI.—Man. Operation, hours after injury.—?. Location of wound.—Upper right abdomen; anterior. Operative findings.—Wound of liver; four perforations large intestine; severe hæmorrhage. Operation.—Enterorrhaphy; suture; drainage. Time and autopsy cause of death.—Fifteen hours; hæmorrhage; shock; early peritonitis.

CASE XLII.—White man, thirty-nine years old. Operation, hours after injury.—?. Location of wound.—Upper left abdomen; lateral; multiple. Operative findings.—Wound of liver; two perforations stomach; moderate hæmorrhage; diaphragm injured. Operation.—Gastrorrhaphy; no drainage. Time and autopsy cause of death.—Three days; bilateral hemothorax peritonitis; hæmorrhage.

CASE XLIII.—Colored man, twenty-four years old. Operation, hours after injury.—Three. Location of wound.—Upper lower left abdomen; anterior; multiple. Operative findings.—Three perforations small intestine; two of sigmoid; severe hæmorrhage. Operation.—Enterorrhaphy; drainage. Time and autopsy cause of death.—three and one-half hours after operation; hæmorrhage; shock.

CASE XLIV.—Colored man, forty-nine years old. Operation, hours after injury.—?. Location of wound.—Lower left abdomen; lateral. Operative findings.—Hematoma retroperitoneal at sigmoid; three contusions serous coat sigmoid; fracture sacrum; slight hæmorrhage. Operation.—Laparotomy; no drainage; second operation forty days later; thoracotomy. Complication.—Rupture of wound; lung abscess; empyema; septicemia; Brown Sequard syndrome. Time and autopsy cause of death.—Fifty days; septicemia; blood culture positive.

CASE XLV.—Colored man, thirty-two years old. Operation, hours after injury.—Three and one-half. Location of wound.—Upper right abdomen; lateral. Operative findings.—Wound of liver; massive hæmorrhage; cavity filled with blood. Operation.—Laparotomy; packing; drainage. Time and autopsy cause of death.—One-half hour after operation; hæmorrhage; shock. Wound right kidney and stomach overlooked.

CASE XLVI.—White man, thirty years old. Operation, hours after injury.—Four and one-half. Location of Wound.—Lower left abdomen. Operative findings.—Wound of spleen; severe hæmorrhage; wound of diaphragm. Operation.—Splenectomy;

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no drainage. Time and autopsy cause of death.—Fifteen hours after operation; hæmorrhage; shock. Wound of liver overlooked.

CASE XLVII.—Colored man, twenty-one years old. Operation, hours after injury.—Two. Location of wound.—Upper left abdomen; multiple. Operative findings.—Two perforations stomach; two of small intestine; two descending colon; tearing wounds of colon at edge; severe hæmorrhage. Operation.—Gastrorrhaphy; enterorrhaphy; suture; drainage. Time and autopsy cause of death.—Twenty-four hours; hæmorrhage; shock; early peritonitis.

CASE XLVIII.—Colored woman, twenty-six years old. Operation, hours after injury.—Five. Location of wound.—Upper left abdomen; lateral. Operative findings.—Eight perforations ileum; one of mesentery; two of colon. Operation.—Enterorrhaphy; suture. Complication.—Local peritonitis; infected wound. Time and autopsy cause of death.—Nine days; died suddenly; peritonitis; embolus?, leakage from colon repair.

CASE XLIX.—Colored man, forty-eight years old. Operation, hours after injury.—Three and one-half. Location of wound.—Lower right abdomen. Operative findings.—Penetrating wound of abdomen; severe hæmorrhage; laceration external iliac vein and artery. Operation.—Laparotomy; ligation; drainage. Time and autopsy cause of death.—On table; hæmorrhage.

CASE L.—White man, fifty-two years old. Operation, hours after injury.—Two. Location of wound.—Lower left abdomen; anterior. Operative findings.—Three perforations ileum; three of mesentery; severe hæmorrhage. Operation.—Enterorrhaphy; suture; ligation; drainage; transfusion. Time and autopsy cause of death.—Twelve hours; hæmorrhage; no autopsy.

CASE LI.—Colored man, twenty-nine years old. Operation, hour after injury.—One-half. Location of wound.—Lower right abdomen; lateral. Operative findings.—Four perforations small intestine; wound of bladder; severe hæmorrhage; fracture right ileum. Operation.—Laparotomy; marsupialization of bladder. Time and autopsy cause of death.—Three days; hæmorrhage; sepsis.

CASE LII.—Colored man, thirty-four years old. Operation, hours after injury.—Four. Location of wound.—Left abdomen; lateral; multiple. Operative findings.—Seven perforations jejunum. Operation.—Enterorrhaphy; drainage. Complication.—Infected wound; lobar pneumonia. Time and autopsy cause of death.—Five days; Pneumonia; peritonitis.

CASE LIII.—Colored man, thirty-seven years old. Operation, hours after injury.—Two and one-half. Location of wound.—Upper left abdomen; anterior; right chest, anterior. Operative findings.—Six perforations jejunum; one of ascending colon; superior mesentery artery severed; severe hæmorrhage. Operation.—Laparotomy. Complication.—Right hemothorax. Time and autopsy cause of death.—On table, hæmorrhage.

CASE LIV.—White man, fifty-five years old. Operation, hours after injury.—Fifty. Location of wound.—Upper left abdomen. Operative findings.—One perforation jejunum. Operation.—Enterorrhaphy. Complication.—General peritonitis. Time and autopsy cause of death.—On table; peritonitis; hæmorrhage.

CASE LV.—Colored woman, twenty-four years old. Operation, hours after injury.—Two and one-half. Location of wound.—Right flank. Operative findings.—Six perforations small intestine; three of descending colon; several lacerations mesentery; severe hæmorrhage. Operation.—Enterorrhaphy; suture; drainage. Time and autopsy cause of death.—Nine hours; hæmorrhage; shock; early peritonitis.

Gunshot-wound Injuries—No Operation—Death

CASE I.—White boy, eighteen years old. Condition on admission.—Moribund. Time and autopsy cause of death.—Ten minutes; hæmorrhage and shock; wound of pyloric end of stomach; vessels in front of spine.

CASE II.—White man, twenty-six years old. Condition on admission.—Moribund.

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Time and autopsy cause of death.—Five minutes; hæmorrhage and shock; branches of aorta severed.

CASE III.—White man, forty years old. Condition on admission.—Moribund. Time and autopsy cause of death.—Few minutes; hæmorrhages and shock; six perforations small intestine; six in mesentery.

CASE IV.—Colored man, thirty-two years old. Condition on admission.—Moribund. Time and autopsy cause of death.—?; hæmorrhage and shock; injuries to stomach, diaphragm, liver, pancreas and duodenum.

CASE V.—Colored woman. Condition on admission.—Moribund. Time and autopsy cause of death.—Forty minutes; hæmorrhage and shock; left pleural cavity filled with blood; wounds of abdomen, chest and left hand. Six hundred cubic centimetres N. S. S. given intravenously.

CASE VI.—White man, twenty-eight years old. Condition on admission.—Moribund. Time and autopsy cause of death.—Few minutes; hæmorrhage and shock; no autopsy.

CASE VII.—White man, fifty years old. Condition on admission.—Suicide. Time and autopsy cause of death.—Five days; cardiac decompensation; passed bloody urine; pneumonia; peritonitis ?; no autopsy.

CASE VIII.—Colored woman, thirty-two years old. Condition on admission. Moribund. Time and autopsy cause of death.—Twenty-six hours; shock and multiple injuries; two perforating wounds of cranium, two penetrating wounds of abdomen; no autopsy.

CASE IX.—White man. Condition on admission.—Moribund. Time and autopsy cause of death.—Thirty minutes; hæmorrhage and shock; wound of right lung; several of liver; multiple of intestines; wounds of vessels in front of spine.

CASE X.—White man, forty-eight years old. Condition on admission.—Moribund. Time and autopsy cause of death.—Few minutes; hæmorrhage and shock; perforation of intestines; liver and gall-bladder.

CASE XI.—Colored man, thirty-four years old. Condition on admission.—Moribund. Time and autopsy cause of death.—Few minutes; hæmorrhage and shock; injury to left lung; both ventricles of heart, liver, vena cava.

CASE XII.—White man, thirty-one years old. Condition on admission.—Moribund. Time and autopsy cause of death.—Few minutes; hæmorrhage and shock; injury to liver, diaphragm.

CASE XIII.—White man, twenty-five years old. Condition on admission.—Moribund. Time and autopsy cause of death.—Five minutes; hæmorrhage and shock; no autopsy.

CASE XIV.—White man, thirty-one years old. Condition on admission.—Moribund. Time and autopsy cause of death.—Few minutes; hæmorrhage and shock; iliac vessels severed.

CASE XV.—Colored man, twenty-three years old. Condition on admission.—Moribund. Time and autopsy cause of death.—One hour; hæmorrhage and shock; wounds of liver and pancreas.

CASE XVI.—Colored man, fifty years old. Condition on admission.—Moribund. Time and autopsy cause of death.—One hour; hæmorrhage and shock; iliac vessels severed.

CASE XVII.—White man, thirty-four years old. Condition on admission.—Moribund. Time and autopsy cause of death.—Two and one-half hours; hæmorrhage and shock; wounds of liver and stomach; did not respond to resuscitating measures.

CASE XVIII.—White man, thirty years old. Condition on admission.—Moribund. Time and autopsy cause of death.—One hour; hæmorrhage and shock; abdomen filled with blood.

CASE XIX.—White man, thirty-two years old. Condition on admission.—Moribund. Time and autopsy cause of death.—One hour; hæmorrhage and shock; no autopsy. One thousand cubic centimetres N. S. S. given.

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CASE XX.—White man, twenty-three years old. Condition on admission.—Moribund. Time and autopsy cause of death.—Two hours; hæmorrhage and shock; large liver wound; grazed side of upper lumbar spine; blood in abdomen.

The liver was injured in 22 cases (no associated injuries in 11)
 The stomach was injured in 9 cases (no associated injuries in 1)
 The small intestine was injured in 18 cases (no associated injuries in 8)
 The large intestine was injured in 8 cases (no associated injuries in 3)
 The spleen was injured in 3 cases (no associated injuries in 2)
 The pancreas was injured in 2 cases
 The kidney was injured in 3 cases (no associated injuries in 1)
 The bladder was injured in 3 cases (no associated injuries in 2)
 The ureter was injured in 1 case

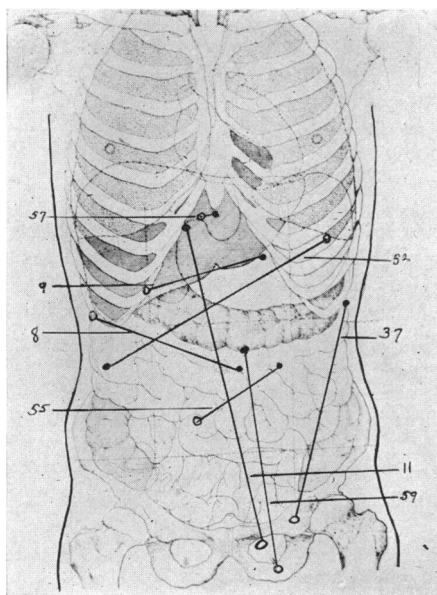


FIG. 1.—Gunshot wounds—operative recoveries. ●—Wound of entrance. ○—Wound of exit. ⊙—Posterior wound. Numbers refer to numbers in respective charts.

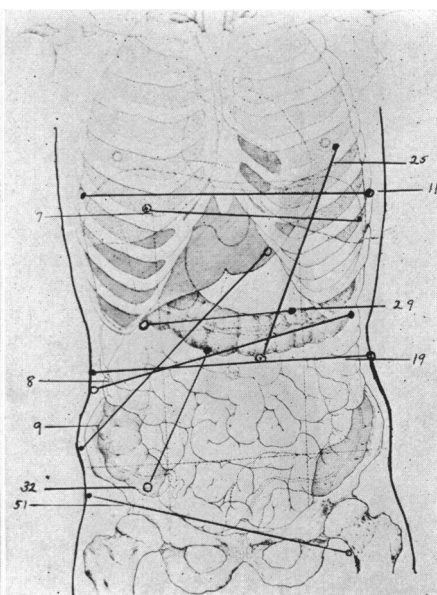


FIG. 2.—Gunshot wounds—operative deaths. ●—Wound of entrance. ○—Wound of exit. ⊙—Posterior wound. Numbers refer to numbers in respective charts.

Resection of the small intestine was done in 3 cases (with end-to-end anastomosis in two and lateral anastomosis in one). A lateral anastomosis without resection was done in one case. Splenectomy was done in one patient who developed tertian malaria during convalescence. Nephrectomy was done in one case. Two cases were transfused, and a re-infusion or replacement of 300 cubic centimetres of blood was done in a case of liver injury.

Ten cases suffered wound infection, 3 of these occurring in 6 patients whose wounds were closed without drainage. Three had general peritonitis, one had local peritonitis, and four had pneumonia.

Two patients recovered without operation who were thought to have had visceral injury. One was in a state of collapse on admission, with all the signs of massive internal hæmorrhage. The pulse was imperceptible, blood

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pressure 60/40, and his general condition so serious that operation was postponed and conservative treatment instituted. His condition had improved so much at the end of twenty-four hours that conservative treatment was continued. The injury was thought to have been one of the spleen. He developed a small left pleural effusion (hæmolytic streptococci on culture from aspirated fluid) with moderate fever for four weeks, and recovered in thirty-eight days. In reference to the other case, it was thought that he did not suffer intra-abdominal injury at the time of admission, but he vomited a considerable quantity of blood on the third day, and developed symptoms of peritonitis with obliteration of liver dullness, marked rigidity and tenderness, when a diagnosis of perforation of stomach was made.

Conservative treatment was continued with gradual improvement of his symptoms until recovery.

Gunshot Deaths.—In this group there were 75 cases, 20 of which were not operated upon for the reason that they were moribund on admission or were never in condition for operation—the table is explanatory. Fifty-five cases were operated upon, 28 of which died within twenty-four hours. Hæmorrhage was severe in 42 cases, and was severe in all who died within twenty-four hours. Fifty-three cases suffered visceral injury. In 2 cases there was no visceral injury, but in each of these there was large blood-vessel damage (abdominal aorta, one; right external iliac vessels, one). It will be seen in the tabulations that multiple visceral and associated visceral injury was present in nearly all of the cases. In the majority of these it was of an extensive nature.

The liver was injured in 23 cases (no associated injuries in 2)

The stomach was injured in 16 cases

The small intestine was injured in 30 cases (no associated injuries in 10)

The large intestine was injured in 16 cases (no associated injuries in 1)

The kidney was injured in 7 cases

The spleen was injured in 3 cases

The pancreas was injured in 3 cases

The bladder was injured in 2 cases

The external iliac vessels were injured in 3 cases (no associated injuries in 1)

The abdominal aorta was injured in 1 case

There were 18 cases with combined abdominal and chest injuries. Five patients were transfused. Intestinal resection was done in 2 cases, nephrectomy in one, and splenectomy in one.

We have autopsy reports on 49 of the 55 gunshot operative deaths checked against operative findings in tabulation of cases. The records revealed that in 9 cases visceral injuries of one kind or another had been overlooked at the time of operation. It is difficult to say what part was played by the unrepaired injuries in the cause of death, but we believe it was an important one. Five of the 9 cases died within twenty-four hours, all attributed to hæmorrhage and shock. The overlooked injuries in these cases included stomach and right kidney in one (45)*, stomach (posterior

* Refers to case numbers in tabulation.

wall), spleen and left kidney in one (25)*, duodenum in one (35)*, pancreas in one (31)*, and left kidney and liver in one (27)*. In another case with severe hæmorrhage from a liver injury, wounds of the right kidney, diaphragm and right lung (23)* were overlooked. Death occurred in twenty-six hours from hæmorrhage and shock. In another case with overlooked wounds of stomach, spleen and diaphragm (11)* death occurred in forty hours from hæmorrhage and shock. A wound of the pancreas (14)* was overlooked in a case of liver, diaphragm and cord injury with severe hæmorrhage. Death occurred in sixteen days from peritonitis and urinary-tract infection. Another case (7) in whom a wound of the liver and posterior wall of the stomach was overlooked lived for twenty-four days. Sub-phrenic abscess and sepsis was the cause of death. In three cases (4, 21, 48)* that died of peritonitis or infection, leakage had occurred subsequent to the repair of perforating wounds of the intestine (duodenum, 1; colon, 2), and probably in each instance was a big factor, if not the direct cause, of death.

In regard to the overlooked injuries, we believe that their occurrence is more common than is generally supposed. The most convincing proof of the correctness of this statement will come from an autopsy "check-up" with operative findings. Those who have had experience in dealing with injuries such as are represented in this group of operative deaths will appreciate the difficulties often encountered at operation, and the ease with which such an error may be committed. The 9 cases in which lesions were overlooked were in very critical condition at the time of operation. Several of them had failed to show any reaction from shock after the use of the usual anti-shock measures, and their condition had rapidly changed from bad to worse because of continued bleeding, the operation having been done primarily for the control of hæmorrhage. Under such circumstances the amount of the anæsthetic and the time required for the operation assume more than the usual importance in the result. It is in such cases that blood transfusion will be of the greatest value. By this means the patient's condition may be so improved that the surgeon can go ahead with a thoroughly satisfactory exploration, and a careful repair of all visceral injuries. The average time between injury and operation for the whole series was a little over three hours, which we believe is early enough. More errors are made in operating too soon than too late. It is important to give the patient a chance to react from shock. Hæmorrhage must be differentiated from shock, and a distinction must be made in the patients whose failure to react is due to continued bleeding. If the pulse is rapid (120 or above), and its rate is not reduced by resuscitating shock measures, hæmorrhage of a serious character may be suspected.

In conclusion we suggest, *first*, the more general and routine use of blood transfusion, and in selected cases of severe hæmorrhage without hollow visceral injury, the re-infusion or replacement of blood can be done to great advantage. *Second*, the adoption of measures calculated to further reduce

* Refers to case numbers in tabulation.

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the incidence of intra-abdominal and wound infection. *Third*, thorough exploration of every case for visceral injury, particularly of the upper abdomen where the risk of overlooking injuries is greatest.

We wish to express our appreciation to Dr. W. S. Wadsworth, coroner's physician of Philadelphia, for the high percentage of autopsy records contained in this series.

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