 JAUNDICE IN SEVERE CASES OF SURGICAL TRAUMA, 12TH GENERAL HOSPITAL
(from 24 Jan 43 - 1 Jun 45)

Up to approximately 1 June 1945 the 12th General Hospital had discharged 10,161 patients who had sustained some sort of surgical trauma. Of these, 6,730 were battle casualties and 3,431 were injuries. In these cases there were sixteen reported diagnoses of hepatitis, of which twelve had jaundice. There were five deaths. Two of these deaths occurred in patients who had had accidental injuries with jaundice (Elliot and Richardson). In one of these (Elliot) it was felt that death was not directly attributable to the original trauma. There were three deaths in the battle casualty group, all in patients with jaundice. The four patients who had hepatitis without jaundice were battle casualties and recovered.

Since certain more severe types of wounds (arbitrarily, chest wounds, abdominal wounds, compound fractures, burns, and traumatic amputations were considered as "severe" wounds) were considered likely to require administration of blood, all casualties and injuries were categorized under these headings. If a wound of these types was not present, the case was listed simply as "Battle Casualty" or "Injury".

The incidence of the various types of wounds and injuries, singly and in combination follows:

**Battle Casualty**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Simple battle casualties</th>
<th>Compound fractures in battle casualties</th>
<th>Traumatic amputations</th>
<th>Burns, battle casualties</th>
<th>Chest wounds</th>
<th>Abdominal wounds</th>
<th>Compound fracture and traumatic amputation</th>
<th>Compound fracture and burns</th>
<th>Compound fracture and chest wounds</th>
<th>Compound fracture and abdominal wounds</th>
<th>Compound fracture and abdominal wounds and burns</th>
<th>Chest and abdominal wounds</th>
<th>Post traumatic epilepsy</th>
<th>Traumatic amputation and burns</th>
<th>Traumatic amputation and abdominal wounds</th>
<th>Traumatic amputation and chest wounds</th>
<th>Traumatic amputation and compound fracture and abdominal wounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totals: Hepatitis</td>
<td>4019</td>
<td>2005</td>
<td>110</td>
<td>122</td>
<td>105</td>
<td>90</td>
<td>12</td>
<td>94</td>
<td>34</td>
<td>17</td>
<td>33</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Injury**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Simple injuries</th>
<th>Compound fractures in injuries</th>
<th>Traumatic amputations in injuries</th>
<th>Burns in injuries</th>
<th>Burns and atrophy of liver (acute yellow atrophy)</th>
<th>Chest wounds in injuries</th>
<th>Chest and abdominal wounds in injuries</th>
<th>Compound fracture and traumatic amputation in injuries</th>
<th>Abdominal wounds in injuries</th>
<th>Compound fracture and burns in injuries</th>
<th>Compound fracture and abdominal wounds in injuries</th>
<th>Compound fracture, burns, and abdominal wounds</th>
<th>Compound fracture, traumatic amputation, chest &amp; abd wounds</th>
<th>Compound fracture, chest, and abdominal wounds</th>
<th>Compound fracture, and chest wounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totals: Hepatitis</td>
<td>2603</td>
<td>548</td>
<td>47</td>
<td>153</td>
<td>1</td>
<td>24</td>
<td>3</td>
<td>16</td>
<td>20</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>
Records of transfusions are not regularly part of board proceedings and hence we cannot be certain of amounts of blood previously given patients. However, following is listing of patients with jaundice or with diagnosis of hepatitis with or without jaundice and our information regarding transfusions. Those patients from year 1944 and 1945 will have undoubtedly received blood replacement in forward installations if their wounds were at all severe.

Initi- Year:
als
L.I. : 1943 : Severe tank burn, died of acute yellow atrophy. Received 7000 cc of blood at the 12th Gen Hosp.
J.R. : 1943 : Severe burn; died with acute yellow atrophy. 8000 cc blood at 12th Gen Hosp.
R. : 1943 : Tank burn; moderate, recovered and was on L.S. Sent to Z.I. with hepatitis with jaundice. No blood at 12th Gen Hosp.
Y. : 1944 : Multiple penetrating wounds; reclassified "B". Hepatitis with icterus, severe. No blood at 12th Gen Hosp.
U.B. : 1944 : Severe thoraco-abdominal wound. Died. Hemoglobinuria nephropathy; Received 1500 cc of blood at 12th Gen Hosp.
B. : 1945 : Compound fracture of femur. Sent to Z.I. Hepatitis, acute, infectious without jaundice. Received 2000 cc of blood at 12th GH.
R. : 1945 : Compound fracture of femur. Sent to Z.I. Hepatitis, acute, infectious without jaundice. Received 500 cc of blood at 12th GH.
T. : 1945 : Several severe compound fractures and other severe wounds. Diabetes. Sent to Z.I. Received 3000 cc of blood at 12th Gen Hosp.
E.J. : 1945 : Severe thoraco-abdominal wound, right, with marked liver loss; numerous secondary hemorrhages. Icteric from time to time. Liver wound but no hepatitis, infectious.

Of the 16 patients with hepatitis 5 died, all with jaundice. One recovered and in the case of the 5 deaths we have autopsy reports concerning the condition of the liver. Two of the deaths were in patients with severe burns who died with acute yellow atrophy of the liver. They would scarcely be classified as acute infectious hepatitis. One of the deaths was in a patient with ruptured bladder who died of acute pulmonary edema not associated with his bladder rupture. The hepatitis in this case appeared to the prosector to be acute infectious hepatitis
with jaundice. Of the two remaining deaths one patient died of uremia due to hemoglobinuric nephropathy from transfusion. The hepatitis in his case was probably associated with the renal pathology. The last patient was a severe thoraco-abdominal wound with extensive liver damage and microscopic study of the liver did not reveal evidence of acute, infectious hepatitis. Of these 5 deaths then, only 1 was a true infectious hepatitis.

Of 53 autopsies performed on patients of the Surgical Service there were 30 in which the microscopic examination of liver tissue showed any changes noted by the prosector. These changes included acute and chronic passive congestion, fatty degeneration, cloudy swelling, hyperplasia of reticulo-endothelial system, acute hepatitis in sepsis, etc. In but one instance was acute infectious hepatitis found. These 30 cases follow herewith:

(Notes regarding liver pathology as shown at post-mortem in every instance in which the prosector made any notation; in all others liver was reported as normal)

Init- Dis, Time
ials : BC, Inj : elapse :

Micro: Numerous areas of focal necrosis
Marked pigmentation of hepatitis perenchyma
Diffuse infiltration of sinusoids with polys.
Path. Diag: Focal necrosis, mild
Hepatitis, acute, diffuse, early
Chronic passive congestion.

M.P. : A.I. : 10 hours: Died 7 May 43 of extensive brain damage. Severe closed skull injury; no fracture.
Micro: Periportal proliferative reaction, monocytic and polys. Mild focal hepatitis, probably normal.
Path. Diag: Periportal hepatitis, patchy, mild.

R.C. : A.I. : 5 days : Died of subarachnoid and retroventricular hemorrhage Profound intracranial damage.
Micro: Minimal fatty degeneration, lymphocytic infiltration of hepatic triad, cloudy swelling.
Path. Diag: Mild, fatty degeneration.
Periportal hepatitis, chronic, mild.

Micro: Several foci of conglomerate tubercles - no significance.
Path. Diag: Cloudy swelling, conglomerate miliary tubercles (quiescent).

J.Mc : B.C. : 44 days : Died of bronchopneumonia, sepsis and debility. SFW, cord and spine.
Micro: Kupffer cell proliferation, pink staining cells with irregular bodies in sinusoids, slight pigmentation.
Path. Diag: Cloudy swelling. Diffuse hyperplasia of reticulo-endothelial cells.

P.C. : B.C. : 36 days : Died, secondary hemorrhage from chest. SFW, chest and spine.
Micro: Marked cloudy swelling, fatty degeneration, slight, early, chronic passive congestion.
Path. Diag: As above.
Init: Dis, Time 
ials: BC,Inj : elapse :

Micro: Acute passive congestion. 
Path. Diag: As above.

L.L.: B.C. : 117 days: Died of acute yellow atrophy of the liver. 
Severe burn. Jaundice present. 
Micro: Massive conglomerate necrosis; "red atrophy" due to hemorrhage into necrotic areas, prior inflammatory reaction brief. 
Path. Diag: Acute, yellow atrophy.

J.R.: A.I. : 100 days: Died of acute yellow atrophy of the liver. 
Severe burn. Jaundice present. 
Micro: Not available. 
Path. Diag: Acute, yellow atrophy of liver.

Micro: Marked, cloudy swelling, Kupfer cells prominent, early, passive congestion. 
Pathl. Diag: Acute parenchymatous degeneration, proliferation of Kupfer cells, acute, passive congestion.

Micro: Excess bile pigment in canaliculi, sinusoids dilated, perportal round cell infiltration, infrequent minute areas of focal necrosis with polymorph infiltration. 
Path. Diag: Focal necrosis. Proliferation of reticuloendothelial cells.

F.P.: B.C. : 12 days: Died of secondary hemorrhage. Severe pelvic wound with erosion into bladder, compound fracture of femur, etc. 
Micro: Acute, passive congestion about central veins, cloudy swelling, Kupfer cells prominent and sinusoids contain polys. 
Path. Diag: As above.

L.B.: A.I. : 5 days: Died of fulminant bronchopneumonia. Fracture, 4th & 5th cervical vertebrae with severe cord damage. 
Micro: Acute, passive congestion. 
Path. Diag: As above.

Path. Diag: Proliferation of Kupfer cells.

B.C.: Dis : 8 months: Died of purulent meningitis. Focus not located at autopsy; brain abscess probably emptied (?). 
Micro: Marked, cloudy swelling of liver cells, Kupfer cells unusually prominent, many polys in sinusoids. 
Path: Diag: Hepatitis, acute, diffuse, due to septicemia.
<table>
<thead>
<tr>
<th>Init.</th>
<th>Dis.</th>
<th>Time</th>
<th>Case</th>
<th>Condition</th>
<th>Pathological Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.C.</td>
<td>A.I.</td>
<td>5 days</td>
<td>Paralytic ileus. Rupture of sigmoid colon with peritonitis. Micro: Chronic passive congestion and mild fatty degeneration.</td>
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<tr>
<td>V.R.</td>
<td>A.I.</td>
<td>2 days</td>
<td>Severe disseminated fecal peritonitis. GSW, perforating, of abdomen, duodenum, jejunum and colon perforations. Micro: Acute, passive hyperemia about central vessels, where liver cells are degenerating, sinusoids wide, distorted and filled with blood. Moderate fatty degeneration. Path. Diag: Fatty degeneration of liver.</td>
<td></td>
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</tr>
<tr>
<td>A.B.</td>
<td>B.C.</td>
<td>10 days</td>
<td>Died; uremia from transfusion incompatibility. Severe SFW, thoraco-abdominal. Jaundice present. Micro: Well marked passive congestion. Rare necrotic cells with Polymorph infiltration, rare small foci of parenchymal necrosis. Path. Diag: Changes may be due to uremia or acute yellow atrophy. Pathologist favors uremia.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>J.B.</td>
<td>B.C.</td>
<td>9 days</td>
<td>Died of pulmonary embolism. Traumatic amputation of leg, multiple, severe wounds. Sulfonamide nephropathy with uremia. Micro: In central portions of lobules cells have disappeared and contain young connective tissue with scattered lymphocytes and occasional macrophages. Path. Diag: Central cirrhosis of liver.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Init- Dis, Inj:elapse of Time:

Micro: Marked periportal hepatitis without connective tissue increase; some round cell and polymorph infiltration. Slight passive congestion.
Path. Diag: Periportal hepatitis, ancient, mild.

E.D. : A.I. : 1½ days : Died; extensive brain damage. Severe cerebral injury plus other wounds.
Micro: pigmentation of central liver cells. Miliary tiny foci of necrosis; scattered polys in sinusoids.
Path. Diag: Focal necrosis of liver, minimal.

Micro: well marked fatty degeneration of central half of lobule.
Path. Diag: Fatty degeneration, moderately severe.

Slignt wound of wrist, long healed.
Micro: Much pigmentation of liver cells centrally. Acute passive congestion.
Path. Diag: As above.

Micro: Acute passive congestion and minimal fatty changes.
Path. Diag: As above.

Lachhorn

Micro: Mild, acute, passive congestion.
Path. Diag: As above.

Micro: Everything from scar and granulations to near normal liver; capillary dilatation, central necrosis, monocytes filled with pigment, necrosis alternate with regeneration.
Path. Diag: Granulating wound of right lobe of liver.