

Table 1. Observations on 23 Cases

| Case No. | Age | Type of Injury   | Extent of Injury                                                                           | Blood Loss | Interval between Injury and Onset of Study (Hours) | Clinical Signs and Symptoms                                               | Blood Pressure Range |           | Temp. Range of Room, Degrees F. | Relative Humidity | Pulse Volumes in cu. mm./5 cu. cm. of Part |                |                   |                | Maximal Increase in Pulse Volume on Blocked Side, Per Cent Diff. | Finger Flows in cu. mm./5 cu. cm. of Part/Min. |                |                   |                | Maximal Increase in Finger Flow on Blocked Side, Per Cent Diff. |
|----------|-----|------------------|--------------------------------------------------------------------------------------------|------------|----------------------------------------------------|---------------------------------------------------------------------------|----------------------|-----------|---------------------------------|-------------------|--------------------------------------------|----------------|-------------------|----------------|------------------------------------------------------------------|------------------------------------------------|----------------|-------------------|----------------|-----------------------------------------------------------------|
|          |     |                  |                                                                                            |            |                                                    |                                                                           | Systolic             | Diastolic |                                 |                   | Before Nerve Block                         |                | After Nerve Block |                |                                                                  | Before Nerve Block                             |                | After Nerve Block |                |                                                                 |
|          |     |                  |                                                                                            |            |                                                    |                                                                           |                      |           |                                 |                   | Right 5th Fing.                            | Left 5th Fing. | Right 5th Fing.   | Left 5th Fing. |                                                                  | Right 5th Fing.                                | Left 5th Fing. | Right 5th Fing.   | Left 5th Fing. |                                                                 |
| 1 (A)    | 22  | Land mine        | Traumatic amp. rt. foot; pen. wound left leg                                               | Sl.        | 3½                                                 | Skin cool; sl. pallor; mod. severe thirst; good pulse volume; very lucid  | 52 to 120            | 115 to 80 | 60 constant                     | 85                | 1.00                                       | 1.30           | 4.55              | 1.30           | 355                                                              |                                                |                |                   |                |                                                                 |
|          |     |                  |                                                                                            |            |                                                    |                                                                           |                      |           |                                 |                   | Right ulnar block                          |                |                   |                |                                                                  |                                                |                |                   |                |                                                                 |
| 2 (A)    | 22  | .45 cal. pistol  | Perf. wound rt. flank and RUQ abd.—extra-peritoneal                                        | Sl.        | 2                                                  | Skin warm and normal pink; sl. thirst; good pulse volume; very lucid      | 140 to 120           | 90 to 80  | 76.3 to 78.1                    | —                 | 1.60                                       | 1.40           | 11.0              | 1.25           | 588                                                              |                                                |                |                   |                |                                                                 |
|          |     |                  |                                                                                            |            |                                                    |                                                                           |                      |           |                                 |                   | Right ulnar block                          |                |                   |                |                                                                  |                                                |                |                   |                |                                                                 |
| 3 (JA)   | 19  | Mortar fragments | Traumatic amp. of rt. and left feet; multiple pen. wounds of both thighs and buttocks      | Sl.        | 3                                                  | Skin cool, sl. pallor; slight thirst; good pulse volume; very lucid       | 140 to 92            | 90 to 50  | 67.3 to 71.0                    | 80                | 0.60                                       | 0.95           | 4.45              | —              | 642                                                              |                                                |                |                   |                |                                                                 |
|          |     |                  |                                                                                            |            |                                                    |                                                                           |                      |           |                                 |                   | Right ulnar block                          |                |                   |                |                                                                  |                                                |                |                   |                |                                                                 |
| 4 (A)    | 21  | M. I. rifle      | Avulsive wound of rt. lower thigh with fracture of rt. patella and distal end of rt. femur | Sl.        | 10                                                 | Skin warm; normal pink nailbeds; no thirst; good pulse volume; very lucid | 192 to 150           | 114 to 90 | 73.4 to 76.1                    | 70                | 1.40                                       | 1.35           | 2.70              | 2.10           | 92.8                                                             | 787                                            | 713            | 918               | 737            | 16.5                                                            |
|          |     |                  |                                                                                            |            |                                                    |                                                                           |                      |           |                                 |                   | Right ulnar block                          |                |                   |                |                                                                  |                                                |                |                   |                |                                                                 |
| 5 (A)    | 22  | .45 cal. pistol  | Perf. wound of left leg and tibia                                                          | Sl.        | 4½                                                 | Skin cool; normal pink skin; no thirst; good pulse volume; very lucid     | 130 to 120           | 80 to 78  | 73.5 to 72.9                    | 63                | 0.55                                       | 0.90           | 0.55              | 8.85           | 884                                                              | —                                              | 106            | —                 | 1,460          | 1,277                                                           |
|          |     |                  |                                                                                            |            |                                                    |                                                                           |                      |           |                                 |                   | Left ulnar block                           |                |                   |                |                                                                  |                                                |                |                   |                |                                                                 |
| 6 (A)    | 18  | Mortar fragments | Mult. pen. wounds of both legs; fracture of rt. ankle                                      | Sl.        | 5                                                  | Skin cool and normal pink; sl. thirst; good pulse volume; very lucid      | 160 to 140           | 100 to 90 | 65.7 to 66.3                    | 90                | 0.50                                       | 0.70           | 0.65              | 4.30           | 514                                                              |                                                |                |                   |                |                                                                 |
|          |     |                  |                                                                                            |            |                                                    |                                                                           |                      |           |                                 |                   | Left ulnar block                           |                |                   |                |                                                                  |                                                |                |                   |                |                                                                 |

Table 1. Observations on 23 Cases—Continued

| Case No. | Age | Type of Injury   | Extent of Injury                                                                                                             | Blood Loss | Interval between Injury and Onset of Study (Hours) | Clinical Signs and Symptoms                                                                                                                | Blood Pressure Range |           | Temp. Range of Room, Degrees F. | Relative Humidity | Pulse Volumes in cu. mm./5 cu. cm. of Part |                |                   |                | Maximal Increase in Pulse Volume on Blocked Side, Per Cent Diff. | Finger Flows in cu. mm./5 cu. cm. of Part/Min. |                |                   |       | Maximal Increase in Finger Flow on Blocked Side, Per Cent Diff. |
|----------|-----|------------------|------------------------------------------------------------------------------------------------------------------------------|------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------|---------------------------------|-------------------|--------------------------------------------|----------------|-------------------|----------------|------------------------------------------------------------------|------------------------------------------------|----------------|-------------------|-------|-----------------------------------------------------------------|
|          |     |                  |                                                                                                                              |            |                                                    |                                                                                                                                            | Systolic             | Diastolic |                                 |                   | Before Nerve Block                         |                | After Nerve Block |                |                                                                  | Before Nerve Block                             |                | After Nerve Block |       |                                                                 |
|          |     |                  |                                                                                                                              |            |                                                    |                                                                                                                                            |                      |           |                                 |                   | Right 5th Fing.                            | Left 5th Fing. | Right 5th Fing.   | Left 5th Fing. |                                                                  | Right 5th Fing.                                | Left 5th Fing. |                   |       |                                                                 |
| 7 (K)    | 27  | Mortar fragments | Fracture of tarsals and metatarsals of left foot; pen. wound of left lower leg                                               | Sl.        | ?                                                  | Skin warm; nailbeds pink; sl. thirst; good pulse volume; lethargic                                                                         | 156 to 140           | 90        | 87.4 to 85.5                    | —                 | 2.35                                       | 1.40           | 2.25              | 3.0            | 114                                                              | 794                                            | 781            | 862               | 2,150 | 175                                                             |
|          |     |                  |                                                                                                                              |            |                                                    |                                                                                                                                            |                      |           |                                 |                   | Left ulnar block                           |                |                   |                |                                                                  |                                                |                |                   |       |                                                                 |
| 8 (K)    | 33  | Mortar fragments | Pen. wound of left leg with comp. spiral fracture of lower ½ of femur; small laceration of anterior neck                     | Sl.        | 4½                                                 | Skin warm; normal pink; slight thirst; good pulse volume; lucid                                                                            | 130 to 116           | 80 to 60  | 82.2 to 82.6                    | 35                | 5.20                                       | 4.25           | 7.80              | 14.75          | 247                                                              | 2,660                                          | 4,720          | 3,170             | 4,580 | 3 decrease                                                      |
|          |     |                  |                                                                                                                              |            |                                                    |                                                                                                                                            |                      |           |                                 |                   | Left ulnar block                           |                |                   |                |                                                                  |                                                |                |                   |       |                                                                 |
| 9 (F)    | 27  | Mortar fragments | Perf. wound entering med. upper left thigh and emerging from left buttock                                                    | Sl.        | 3½                                                 | Skin cool; normal pink color; no thirst; good pulse volume; slightly lethargic; piloerection over arms and shoulders                       | 114 to 90            | 80 to 70  | 78.8 to 77.4                    | 50                | 1.70                                       | 0.95           | 1.70              | 6.55           | 590                                                              | 846                                            | 371            | 458               | 2,720 | 633                                                             |
|          |     |                  |                                                                                                                              |            |                                                    |                                                                                                                                            |                      |           |                                 |                   | Left ulnar block                           |                |                   |                |                                                                  |                                                |                |                   |       |                                                                 |
| 10 (A)   | 21  | Mortar fragments | Pen. wounds of rt. leg, rt. thigh, and rt. lateral neck.                                                                     | Sl.        | 4½                                                 | Skin very warm; normal pink; no thirst; good pulse volume; very lucid.                                                                     | 156 to 120           | 90 to 80  | 84.9 to 87.8                    | 25                | 1.55                                       | 2.40           | 1.55              | 5.75           | 140                                                              | 396                                            | 897            | 548               | 2,500 | 179                                                             |
|          |     |                  |                                                                                                                              |            |                                                    |                                                                                                                                            |                      |           |                                 |                   | Left ulnar block                           |                |                   |                |                                                                  |                                                |                |                   |       |                                                                 |
| 11 (K)   | 25  | Small arms fire  | Pen. wound of abdomen RUQ resulting in: extensive laceration of rt. lobe of liver; perf. of asc. colon, duodenum, and ileum; | Sl.        | 4½                                                 | Cool skin; marked flush of face and neck; moderate thirst; pulse rapid and thready; lethargic and restless; patient died on 1st postopera- | 120 to 60            | 70 to 20  | 81.0 to 79.9                    | 50                | 0.55                                       | 0.65           | 3.20              | 0.65           | 481                                                              |                                                |                |                   |       |                                                                 |
|          |     |                  |                                                                                                                              |            |                                                    |                                                                                                                                            |                      |           |                                 |                   | Right ulnar block                          |                |                   |                |                                                                  |                                                |                |                   |       |                                                                 |



Table 1. Observations on 23 Cases—Continued

| Case No. | Age | Type of Injury            | Extent of Injury                                                                                                  | Blood Loss     | Interval between Injury and Onset of Study (Hours) | Clinical Signs and Symptoms                                                               | Blood Pressure Range |           | Temp. Range of Room, Degrees F. | Relative Humidity | Pulse Volumes in cu. mm./5 cu. cm. of Part |                |                   |                | Maximal Increase in Pulse Volume on Blocked Side, Per Cent Diff. | Finger Flows in cu. mm./5 cu. cm. of Part/Min. |                |                   |       | Maximal Increase in Finger Flow on Blocked Side, Per Cent Diff. |
|----------|-----|---------------------------|-------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------|-------------------------------------------------------------------------------------------|----------------------|-----------|---------------------------------|-------------------|--------------------------------------------|----------------|-------------------|----------------|------------------------------------------------------------------|------------------------------------------------|----------------|-------------------|-------|-----------------------------------------------------------------|
|          |     |                           |                                                                                                                   |                |                                                    |                                                                                           | Systolic             | Diastolic |                                 |                   | Before Nerve Block                         |                | After Nerve Block |                |                                                                  | Before Nerve Block                             |                | After Nerve Block |       |                                                                 |
|          |     |                           |                                                                                                                   |                |                                                    |                                                                                           |                      |           |                                 |                   | Right 5th Fing.                            | Left 5th Fing. | Right 5th Fing.   | Left 5th Fing. |                                                                  | Right 5th Fing.                                | Left 5th Fing. |                   |       |                                                                 |
| 18 (A)   | 21  | Artillery shell fragments | Perf. wounds of rt. and left thighs; fract. of right fibula                                                       | Sl.            | 5½                                                 | Skin cool; normal pink color; slight thirst; good pulse volume; intermittently lethargic  | 144 to 130           | 90 to 60  | 70.2 to 71.2                    | 75                | 1.50                                       | 1.35           | 1.10              | 5.65           | 319                                                              | 539                                            | 721            | 375               | 3,630 | 390                                                             |
|          |     |                           |                                                                                                                   |                |                                                    |                                                                                           |                      |           |                                 |                   | Left ulnar block                           |                |                   |                |                                                                  |                                                |                |                   |       |                                                                 |
| 19 (A)   | 22  | Mortar fragments          | Pen. wound of RUQ of abdomen                                                                                      | Sl.            | 7½                                                 | Skin warm; normal pink color; no thirst; good pulse volume; very lethargic                | 138 to 120           | 84 to 64  | 86.0 to 88.3                    | 65                | 3.20                                       | 1.90           | 1.90              | 5.70           | 200                                                              | 722                                            | 389            | 498               | 1,050 | 170                                                             |
|          |     |                           |                                                                                                                   |                |                                                    |                                                                                           |                      |           |                                 |                   | Left ulnar block                           |                |                   |                |                                                                  |                                                |                |                   |       |                                                                 |
| 20 (A)   | 21  | Mortar fragments          | Comp. fract. involving lower leg, with involvement of tibia, fibula, and tarsal bones; pen. small wds. of rt. arm | Sev.           | 5                                                  | Skin warm; mod. pale skin; slight thirst; rapid, thready pulse; markedly lethargic        | 134 to 70            | 70 to 0   | 90.0 to 90.3                    | -----             | 4.35                                       | 4.0            | 3.15              | 3.40           | 15 decrease                                                      | 7 pints of whole blood post block              |                |                   |       |                                                                 |
|          |     |                           |                                                                                                                   |                |                                                    |                                                                                           |                      |           |                                 |                   | Left ulnar block                           |                |                   |                |                                                                  |                                                |                |                   |       |                                                                 |
| 21 (A)   | 23  | Mortar fragments          | Traumatic amp. rt. lower leg; multiple pen. wounds of left lower leg                                              | None (Post-op) | 20                                                 | Skin warm; normal pink; slight thirst; rapid pulse of good volume; alert and apprehensive | 164 to 148           | 96 to 106 | 84.4 to 90.3                    | 55                | 3.15                                       | 3.75           | 3.60              | 3.75           | 14                                                               | 1,610                                          | 2,300          | 1,300             | 1,630 | 19.2 decrease                                                   |
|          |     |                           |                                                                                                                   |                |                                                    |                                                                                           |                      |           |                                 |                   | Right ulnar block                          |                |                   |                | After sodium amytal gr. 3½                                       |                                                |                |                   |       |                                                                 |
|          |     |                           |                                                                                                                   |                |                                                    |                                                                                           |                      |           |                                 |                   |                                            |                | 2.70              | 4.05           |                                                                  |                                                |                | 1,080             | 2,100 |                                                                 |
| 22 (A)   | 24  | Mortar fragments          | Pen. wounds of left flank and left buttock                                                                        | Sl.            | 6                                                  | Skin warm; normal pink color; sl. thirst; slow, full pulse; slightly lethargic            | 100 to 86            | 40 to 46  | 81.3 to 82.7                    | -----             | 1.65                                       | 1.75           | 1.85              | 19.0           | 985                                                              | 303                                            | 370            | 475               | 4,120 | 1,014                                                           |
|          |     |                           |                                                                                                                   |                |                                                    |                                                                                           |                      |           |                                 |                   | Left ulnar block                           |                |                   |                |                                                                  |                                                |                |                   |       |                                                                 |

|           |    |                          |                                                                                               |     |   |                                                                                |                  |                |      |    |      |                  |      |      |    |       |       |       |       |                 |
|-----------|----|--------------------------|-----------------------------------------------------------------------------------------------|-----|---|--------------------------------------------------------------------------------|------------------|----------------|------|----|------|------------------|------|------|----|-------|-------|-------|-------|-----------------|
| 23<br>(A) | 22 | Mortar<br>frag-<br>ments | Perf. wounds rt. leg<br>with much soft tissue<br>destruction; comp.<br>comm. fract. of tibia. | Sl. | 4 | Skin warm; slight pallor;<br>mod. thirst; good pulse<br>volume; mod. lethargic | 130<br>to<br>110 | 80<br>to<br>70 | 83.8 | 72 | 3.35 | 3.75             | 3.50 | 5.25 | 40 | 1,520 | 3,080 | 2,440 | 2,930 | 5 de-<br>crease |
|           |    |                          |                                                                                               |     |   |                                                                                |                  |                |      |    |      | Left ulnar block |      |      |    |       |       |       |       |                 |

- (K)-Korean
- (A)-American
- (F)-Filipino
- (JA)-Japanese-American

Maximal percentage increase=  
in pulse volume or flow

$$\frac{\text{Value after nerve block} - \text{minus control value}}{\text{Control value}} \times 100$$

Precision in pulse volume and flow values is not maintained beyond the second significant figure.

Pulse volumes are expressed in cubic millimeters per 5 cubic centimeters of part and finger flows in cubic millimeters per 5 cubic centimeters of part per minute.