**Supplementary Table 1** Sensitivity/subgroup analyses restricted to multiple subgroups.

| Variables                                      | OR  | Lower limit | Upper limit | P value |
|-----------------------------------------------|-----|-------------|-------------|---------|
| **Sensitivity analyses limited to patients with age <65 years** |     |             |             |         |
| Surgeon volume (<7 vs ≥7/year)                | 3.2 | 1.2         | 21.3        | 0.021   |
| Epidural/spinal vs general anesthesia          | 4.5 | 0.8         | 25.7        | 0.093   |
| Renal insufficiency                           | 11.0| 3.4         | 52.1        | <0.001  |
| Allogeneic blood transfusion                  | 6.5 | 1.9         | 17.2        | 0.006   |
| **Sensitivity analyses limited to patients without concurrent fractures** |     |             |             |         |
| Surgeon volume (<7 vs ≥7/year)                | 3.6 | 1.5         | 9.2         | 0.001   |
| Subluxation/dislocation                       | 3.6 | 1.1         | 11.8        | 0.032   |
| Allogeneic blood transfusion                  | 15.1| 2.9         | 78.5        | <0.001  |
| Sex (female vs male)                          | 2.7 | 1.3         | 5.2         | 0.006   |
| Age (each 1-year increment)                   | 1.05| 1.01        | 1.09        | 0.021   |
| **Sensitivity analyses limited to patients with concurrent fractures** |     |             |             |         |
| Surgeon volume (<7 vs ≥7/year)                | 6.8 | 2.1         | 18.7        | 0.013   |
| Renal insufficiency                           | 8.1 | 2.1         | 26.1        | 0.000   |
| Allogeneic blood transfusion                  | 6.0 | 1.8         | 19.7        | 0.003   |
| **Sensitivity analyses limited to patients with unimalleolar fractures** |     |             |             |         |
| Surgeon volume                                | 3.3 | 1.2         | 9.1         | 0.019   |
| Predictive Factor                          | (<7 vs ≥7/year) | (<7 vs ≥7/year) | (<7 vs ≥7/year) | (<7 vs ≥7/year) |
|------------------------------------------|-----------------|-----------------|-----------------|-----------------|
| Renal insufficiency                      | 15.7            | 4.4             | 55.7            | <0.001          |
| Allogeneic blood transfusion             | 9.8             | 2.4             | 38.3            | <0.001          |
| RBC < lower limit                        | 3.1             | 1.3             | 9.2             | 0.020           |
| **Sensitivity analyses limited to patients with bi- and tri-malleolar fractures** |                 |                 |                 |                 |
| Surgeon volume                           | 4.4             | 1.1             | 18.7            | 0.044           |
| Concurrent fracture                      | 12.2            | 1.9             | 78.8            | 0.009           |
| Subluxation/dislocation                  | 22.0            | 3.0             | 160.8           | 0.002           |
| Allogeneic blood transfusion             | 6.9             | 1.9             | 36.0            | 0.014           |
| Age (each 1-year increment)              | 1.13            | 1.05            | 1.21            | 0.001           |
| ALB <35g/L                               | 2.6             | 1.3             | 4.8             | 0.037           |
| **Sensitivity analyses limited to patients receiving procedure within 14 days** |                 |                 |                 |                 |
| Surgeon volume                           | 5.6             | 2.4             | 12.8            | <0.001          |
| Concurrent fracture                      | 2.7             | 1.1             | 6.5             | 0.026           |
| Epidural/spinal vs general anesthesia    | 4.6             | 1.7             | 7.3             | <0.001          |
| Allogeneic blood transfusion             | 5.3             | 1.7             | 25.9            | 0.003           |
| Age (each 1-year increment)              | 1.05            | 1.02            | 1.08            | 0.001           |
| **Sensitivity analyses limited to patients operated by surgeons with ≥10 years' experience** |                 |                 |                 |                 |
| Surgeon volume                           | 2.7             | 1.1             | 6.9             | 0.017           |
|                                |   |   |     |    |
|--------------------------------|---|---|-----|----|
| Renal insufficiency            | 5.1| 1.7|31.2 |<0.001|
| Concurrent fracture            | 3.1| 1.5|17.2 |0.002|
| Epidural/spinal vs general anesthesia | 3.1| 1.3| 6.2 |0.003|
| Allogeneic blood transfusion   | 4.9| 1.7|16.3 |0.006|
| Age (each 1-year increment)    | 1.05|1.03|1.08 |0.001|

*Statistical results of surgeon volume and the variables tested with P<0.10 were listed in this Table. Note: The independent multivariable models was constructed with total variables tested as P<0.10 in the univariable analyses entered for adjustment.