



Effect of chronic heavy smoking on proximal humerus fractures

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Target group

- Osteomyelitis
- Delayed union
- Non-union
- Limited studies
- **Retrospective comparative study**
- Chronic heavy smoking
- Closed proximal humerus fracture



Study design

- 5-Year period, 1752 patients
- Chronic heavy smoking
- No hormonal disorders
- No medications affecting metabolism
- Given advice to stop smoking



118 met the inclusion criteria

- Comparative arm: age, sex, Neer, Rx requirements, closed fractures, non-smokers

Outcome factors

- **Primary**

- Time to fracture union
- Time to wound healing

- **Secondary**

- Postoperative complications (pain, bleeding, swelling, infection, non-union, mal union, delayed union, compartment syndrome and neurovascular impairment)
- Satisfactory RoM at 4 weeks
- Mobility at last R/V (same before injury, worse)



Results

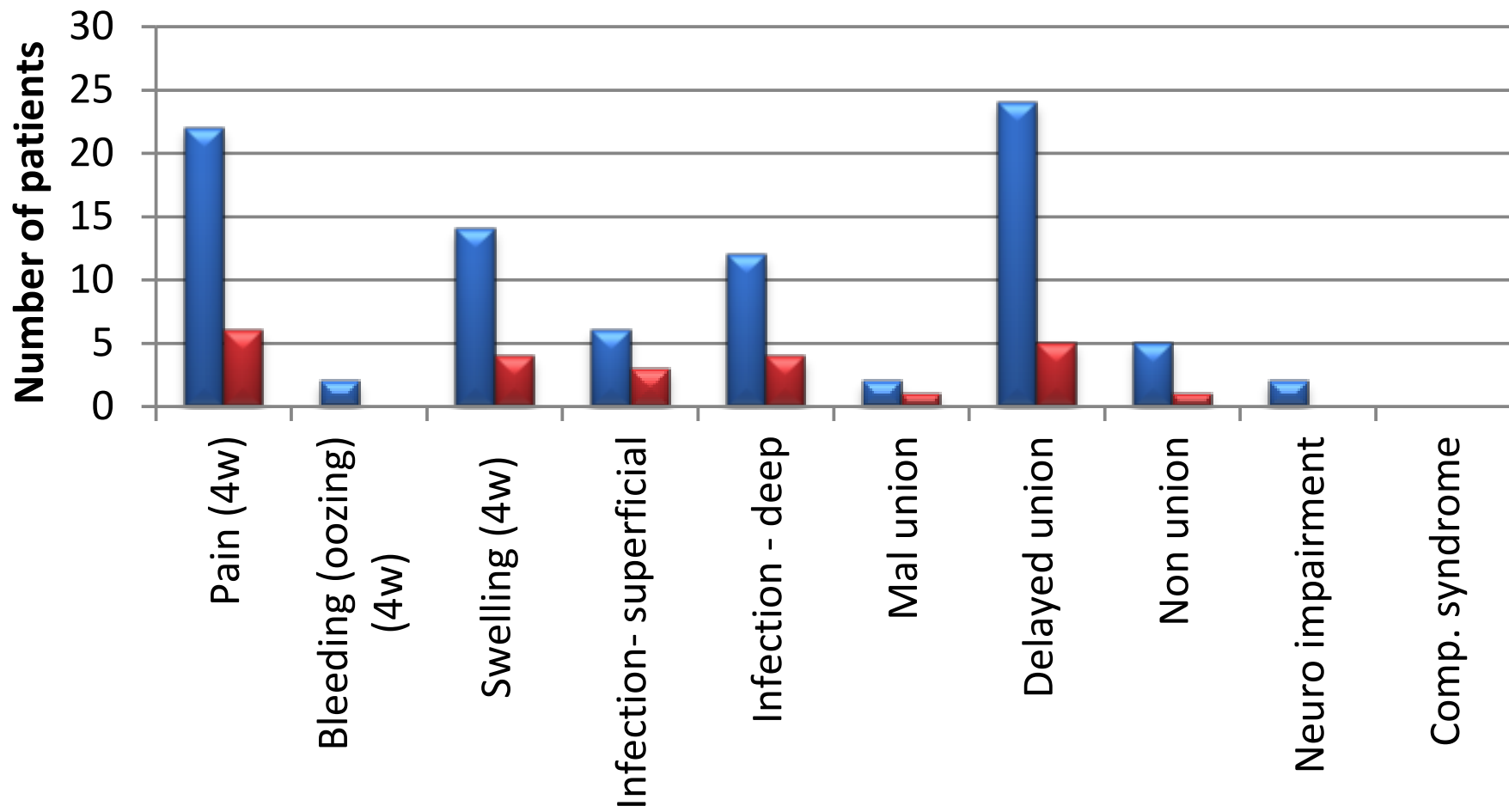
- CHS group
 - 31 males
 - 87 females
 - 57 years
 - 14 had ORIF
- Control group
 - 45 males
 - 73 females
 - 46 years
 - 10 had ORIF

One-part, two-part, three-part or four-part fracture and their displacements $>1\text{cm}$ or $>45^\circ$

| Primary outcomes | CHS | CHS | CHS | Control |
|------------------------------|-------|--------------|----------|---------|
| | | Conservative | Surgical | |
| Time to wound healing | | | | |
| Mean (weeks) | 6 | 6 | 7 | 2 |
| Minimum-Maximum | 3-8 | 3-7 | 3-8 | 1-2 |
| Standard deviation | ±2 | ±2 | ±2 | ±1 |
| | | | | |
| Time to union | | | | |
| Mean (weeks) | 12 | 11 | 14 | 9 |
| Minimum-Maximum | 10-19 | 10-15 | 12-19 | 7-10 |
| Standard deviation | ±2 | ±1 | ±2 | ±1 |

| Secondary outcomes | CHS group | Control | CHS vs. C | CHS vs. C |
|------------------------|-----------|---------|-----------|-----------|
| | n=118 | n=118 | Pearson | Fisher |
| Pain (4w) | 22 | 6 | <.001** | .002* |
| Bleeding (oozing) (4w) | 2 | 0 | - | - |
| Swelling (4w) | 14 | 4 | <.001** | .002* |
| Infection- superficial | 6 | 3 | .002* | .003* |
| Infection - deep | 12 | 4 | <.001** | .003* |
| Mal union | 2 | 1 | 0.242 | 0.321 |
| Delayed union | 24 | 5 | <.001** | .002* |
| Non union | 5 | 1 | .002* | .005* |
| Neuro impairment | 2 | 0 | - | - |
| Comp. syndrome | 0 | 0 | - | - |

■ Treatment cohort ■ Control cohort



| Secondary outcomes II | CHS | Control |
|------------------------------|------------|----------------|
| | | |
| Satisfactory RoM (4w) | 96 | 103 |
| | | |
| Mobility at last R/V | | |
| Same to before injury | 92 | 109 |
| Dependent – worse | 14 | 6 |

Effect of smoking

- Blood vessels lining
- Lipids level in the blood

- Many pathologies
- Atheroma formation

- Long-term excessive smoking
- Blood supply (reduced oxygenation)
- **Delayed union**
- **Poor wound healing**
- **Other complications**

Conclusion

- Chronic heavy smokers
- Delayed fracture union
- **Surgical fixation**: poor wound healing, postoperative pain and deep surgical infection.
- Smoking cessation programmes

Thank you

Questions?