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Surgical versus Conservative Treatment for Odontoid Fractures in the Elderly: A Prospective Cohort Study

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Background: The optimal treatment for odontoid fractures (OF) in the elderly remains debated. OF are increasingly relevant to clinical practice due to ageing of the population.

Research question: What are the outcomes of surgical compared with conservative treatment for OF in elderly patients?

Design: A prospective comparative study called the INNOVATE trial. Fifteen medical centres in eight European countries participated.

Methods: Selection criteria were age ≥55 years, acute (<2 weeks) type II/III OF, no rheumatoid arthritis/ankylosing spondylitis, and no previous OF treatment. The attending surgeon and patient made a shared decision on the applied treatment modality. Surgical treatment was compared with conservative treatment. Primary outcomes were Neck Disability Index (NDI) improvement, fracture union and fracture stability at 52 weeks. Secondary outcomes were VAS neck pain, Likert patient-perceived recovery, and EQ5D at 52 weeks. Subgroup analyses were done for age, type II fractures and displaced fractures. Multivariable regression analyses adjusted for age, gender and fracture characteristics.

Results: The study included 276 patients, of which 144 (52%) were treated surgically (mean (SD) age 77.3 (9.1); 72 (50%) males) and 132 (48%) conservatively (mean (SD) age 76.6 (9.7); 53 (40%) males). NDI improvement was largely similar between surgical and conservative treatments (mean (SE) -11 (2.4) vs. -14 (1.8), p=0.08), as were union (86% vs. 78%, aOR 2.3,

95% CI 0.97-5.7), and stability at 52 weeks (99% vs. 98%, aOR NA). NDI improvement did not differ between patients with union and persistent non-union (mean (SE) -13 (2.0) vs. -12 (2.8), *p*=0.78). There was no difference between treatments for any of the secondary outcomes or subgroups.

Discussion: Clinical outcome and fracture healing at 52 weeks were similar between surgical and conservative treatments. Clinical outcome and fracture union were not associated. Conservative treatment is justified as primary treatment.