

126. Osteoporosis in Quadriplegic Cerebral Palsy: Risk Factors, Protective Effect of Epilepsy and Anticonvulsants

Audrius V. Pliophlys, Irene Kasnicka, and Shelley Lewis; Bloomington and Elgin, IL

We investigated risk factors that may be associated with the development of disuse osteoporosis in patients with severe cerebral palsy. 32 individuals with quadriplegic cerebral palsy, who had a fracture, were identified (age range 7–33 y; 12 females; 20 males). All were receiving adequate amounts of calcium and vitamin D. None had received steroid treatments. All underwent bone mineral density Z-score determinations using a Hologic QDR-1000 X-ray Bone Densitometer (DXA). Hip BMD results were obtained in 16 cases, and lumbar spine in 27. Clinical data was correlated with the Z scores using Pearson's product moment correlation and multiple linear regression analysis. This investigation was approved by ethics review committees, and informed consent was obtained from the guardians. Using the hip BMD results, there was a protective effect associated with the female sex ($p = 0.004$) and the use of carbamazepine ($p = 0.045$). With the spine results, there was a correlation with age (older individuals had more severe osteoporosis; $p = 0.024$). There was also a protective effect with the use of benzodiazepines for seizures and spasticity ($p = 0.024$). There was a mild protective effect of epilepsy which did not reach statistical significance ($p = 0.124$). There was no correlation with the presence or absence of G-tube, tracheostomy, or the use of valproic acid, phenytoin, or phenobarbital. These results indicate that age and the male sex are significant risk factors for the development of disuse osteoporosis in cerebral palsy. The use of carbamazepine and benzodiazepines had a protective effect, as did the presence of epilepsy.

164. Calcitonin Treatment of Osteoporosis in Quadriplegic Cerebral Palsy

Audrius V. Pliophlys, Irene Kasnicka, and Shelley Lewis; Bloomington and Elgin, IL

This investigation studied the therapeutic effect of calcitonin nasal spray on cerebral palsy disuse osteoporosis. 24 individuals with quadriplegic cerebral palsy, who had a fracture, were identified (age range 9–33 y; mean 20 y; 10 females, 14 males). All were receiving adequate amounts of calcium and vitamin D. None had received steroid treatments. All underwent bone mineral density determinations using a Hologic QDR-1000 X-ray Bone Densitometer (DXA) before and after 1, 2 and 3 years of treatment. Each was treated with one calcitonin nasal spray (=200 units), 5 times per week, 3 months of treatment alternating with one month of no treatment. Two were treated for 1 year, 15 for 2 years, and 7 for 3 years. This investigation was approved by ethics review committees, and informed consent was obtained from the guardians. There was a statistically significant increase in lumbar spine BMD, in younger individuals ($p < 0.05$). Those who were younger than 19 years had a mean increase of 6.1% per year in spine BMD. In those over 19, BMD increased 0.2% per year. A similar trend, that was not statistically significant, was seen in total hip BMD determinations, where in those younger than 19 years, BMD increased, a mean of 8.5% per year. In those over 19, hip BMD decreased a mean of 1.8% per year. These results indicate that calcitonin may be an effective treatment of cerebral palsy disuse osteoporosis and that better responses may occur in younger individuals.

165. Pulmonary Vest Therapy in Quadriplegic Cerebral Palsy

Audrius V. Pliophlys, Shelley Lewis, and Irene Kasnicka; Elgin and Bloomington, IL

Pulmonary infections are common in children with quadriplegic cerebral palsy (CP). High frequency chest wall oscillation with Advanced Respiratory Inc. vest therapy (VT) is used to promote pulmonary clearance and to prevent pneumonias in cystic fibrosis patients. The purpose of this study was to ascertain the effectiveness of VT in patients with quadriplegic CP. Seven individuals with quadriplegic CP, who had frequent pulmonary infections, were identified (age range: 7–28 years; median 19 years; 2 females and 5 males). All were wheelchair bound and were fed by G-tube. Five had a tracheostomy and three had epilepsy. Clinical data was collected for 12 months prior to starting VT and during 12 months of VT. The total number of pneumonias decreased from 36 per year prior to VT, to 18 during the year of VT ($p < 0.05$). The number of hospitalizations due to pneumonia decreased from 9 to 3. With VT, the frequency of effective suctioning of pulmonary secretions was significantly increased ($p < 0.01$). In the patients with epilepsy, with VT, the average monthly frequency of seizures decreased from 4 to 1, from 9 to 2, and from 9 to 1. VT resulted in more effective suctioning of pulmonary secretions, reduced incidence of pneumonia, and reduced number of hospitalizations. In patients with epilepsy, VT reduced seizure frequency. VT was tolerated well, without complications or side effects. To the authors' knowledge this is the first report of a series of patients with cerebral palsy being treated with VT.

Papers were presented at
the Child Neurology Society
meeting, Washington, DC,
October 10-12, 2002.

Abstracts were published in
the Annals of Neurology,
September 2002,
Volume 52, Supplement 1,
pages S145-6, S156.