Cortical biopsy in Alzheimer's disease

Neurochemical assessments were performed on biopsy samples taken from the right frontal lobe of patients diagnosed with Alzheimer's disease (AD), before the implantation of a ventricular catheter and pump assembly for the infusion of bethanechol chloride as an experimental therapy. The pathologically diagnosed patients with AD (n = 35; mean age, 67 +/- 1.5 yr) were compared with a group of samples from normal age-equivalent autopsied controls (n = 22; mean age, 68 +/- 2 yr) and autopsied AD brains (n = 11; mean age, 73 +/- 2 yr). Samples were assayed for choline acetyltransferase (ChAT), acetylcholinesterase, binding to [3H]quinuclidinyl benzilate as an index of total muscarinic cholinergic binding, and [3H]pirenzepine binding as an index of M1 cholinergic receptor subtype binding. Mean levels of ChAT activity were decreased in the biopsied patients to 36% of age-matched autopsied controls. The loss of ChAT activity correlated significantly with the Mini-Mental State Examination, an index of global cognitive function. Mean ChAT activity in autopsied AD cortex was further decreased compared with controls, indicating continuous decline through the course of the disease. Acetylcholinesterase followed a similar, less dramatic decline. No differences were found in [3H]quinuclidinyl benzilate binding or [3H]pirenzepine binding between biopsied and autopsied controls. Neuritic plaque counts did not correlate with either the Mini-Mental State Examination or ChAT activity in the biopsy specimens [1)].

1)
DeKosky ST, Harbaugh RE, Schmitt FA, Bakay RA, Chui HC, Knopman DS, Reeder TM, Shetter AG, Senter HJ, Markesbery WR. Cortical biopsy in Alzheimer's disease: diagnostic accuracy and neurochemical, neuropathological, and cognitive correlations. Intraventricular Bethanecol Study Group. Ann Neurol. 1992 Nov;32(5):625-32. PubMed PMID: 1360195.