A method for solving the Byzantine agreement problem [M. Fitzi, N. Gisin, and U. Maurer, Phys. Rev. Lett. 87, 217901 (2001)] and the liar detection problem [A. Cabello, Phys. Rev. Lett. 89, 100402 (2002)] is introduced. The main advantages of this protocol are that it is simpler and is based on a four-qubit singlet state already prepared in the laboratory.