SHORT REPORT

Strong mixed-handedness in schizophrenia

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Abstract

There is still considerable discussion of whether schizophrenia is a lateralized brain disorder. In fact, schizophrenics appear to exhibit a shift away from dexterity, as confirmed by the majority of the 23 publications dealing with this question (14 positive, seven null, two paradoxical). However, quite a few of these positive studies have distinguished between left-handedness and mixed-handedness (MH), thus lacking specificity. Whereas prior studies failed to specify schizophrenic MH, we could observe a significant relationship between strong MH and schizophrenia in male patients in a relatively small group due to sex differentiation and accurate application of Annett’s hand preference questionnaire.

Key Words: Schizophrenia, laterality, mixed-handedness, Annett’s hand preference questionnaire

Introduction

There is still considerable discussion whether schizophrenia is a lateralized brain disorder [1]. In fact, schizophrenics appear to exhibit a shift away from dexterity, as confirmed by the majority of the 23 publications dealing with this question (14 positive, seven null, two paradoxical) [2]. However, quite a few of these positive studies have distinguished between left-handedness and mixed-handedness (MH), thus lacking specificity. Green et al [3] and Cannon et al [4] found an excess of MH in patients with schizophrenia, but no increase in left-handedness. However, Malesu and colleagues [5] paid special attention to MH and failed to show any significant differences in a large sample (n = 120) of schizophrenic patients. To our knowledge, there have been no previous published studies designed to specifically investigate the several subtypes of MH in schizophrenia. Moreover, none of the above-mentioned studies examined sex differences, although recent findings underscore the importance of this issue in schizophrenic laterality effects [6,7].

Methods and results

Our preliminary prospective study intended to investigate the prevalence of the subtypes of MH in schizophrenia according to DSM-IV criteria. Sixty-two inpatients (24 female, aged 14–49 years, mean age 34.7), and 146 healthy controls (73 female, aged 19–45 years, mean age 23.7) were administered the Annett hand preference questionnaire [8]. We asked each subject which hand they used for six primary and six secondary items. Based on their responses, we assigned each subject to one of seven hand preference classes. We thereafter divided MH into three different subtypes according to Annett’s proper classification [7], including weak (classes 2 and 7), moderate (class 3), and strong mixed (classes 4 and 6) subtypes. In addition, we used the hand preference inventory by Briggs and Nebes [9]. This represents a five-point scale measuring strength of laterality for each item of the Annett’s questionnaire. It classifies handedness into three subtypes (left, right and mixed).

In our controls, the rates of right-, left-, and mixed-hand preference in both methods (Annett and Briggs) were similar to the prevalence reported in the literature. In the patients, Briggs’ method was not useful in detecting significant differences between the groups. Annett’s questionnaire, however, which allows differentiating three subtypes of MH, was sensitive enough to discover important distinctions. Whereas female patients lacked any difference in comparison with the female control group, male schizophrenics showed a significantly higher incidence of strong MH (see Table I), compared with male controls (χ²-test, P = 0.042).

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(Received 28 June 2004; accepted 20 December 2004)

ISSN 1365-1501 print ISSN 1471-1788 online © 2005 Taylor & Francis
DOI: 10.1080/136515050510018284
Discussion

Our results fulfill partly what Malesu et al. [5] hypothesized. Although Malesu et al.’s results show a trend in the hypothesized direction, this study group failed to demonstrate that schizophrenic patients differed from controls on self-reported hand preference patterns due to the limitation of their proper method. They simply classified handedness into three categories: right, mixed and left-handedness, thus including mixed classes (classes 2–7) in one single group. Proceeding similarly, our results would have failed to show significant differences as well. Likewise, the comparison between right- and non-right-handedness lacks significant differences in both sexes matched with the control values in our (very small) cohort, and our results do not show a higher incidence of left-handedness in schizophrenics.

Beyond all unquestionable limitations of this preliminary study, our findings may be related with Crow’s hypothesis [10] that schizophrenia is associated with a generalized failure of hemispheric specialization. A family study was reported by DeLisi et al with similar findings [11]. Strong MH could represent a potential biological marker of an underlying neurodevelopmental insult that occurred much earlier during prenatal development [2]. If so, this marker could represent a potential sign of nongenetic cases of schizophrenia.

The sex difference found in our study seems to be in accordance with other findings of gender interaction in schizophrenics [6]. Male patients show a more pernicious form of illness throughout life, and have more severe negative symptomatology [12]. Furthermore, male patients have reduced left, relative to right, temporal brain volumes in MRI measurements [13]. Possibly, whatever mechanism is responsible for more severe negative symptoms in males also has its greatest impact on the development of the left hemisphere and therefore on handedness. Interestingly, similar to our results, Crow et al found an increase in ambidexterity in pre-psychotic children at ages 7 and 11 [14]. In a recent meta-analysis by Sommer et al [15], strong evidence is provided for decreased cerebral lateralization in schizophrenia. The prevalence of mixed- and left-handedness (“non-right-handedness”) was significantly higher in patients with schizophrenia as compared to healthy controls, and also as compared to psychiatric controls.

In summary, (1) the distinction between strong, moderate and weak MH in Annett’s classification, and (2) an accurate sex differentiation, seem to be essential in order to examine the prevalence of atypical handedness in schizophrenia. Whereas prior studies failed to specify schizophrenic MH, we observed a significant relationship between strong MH and schizophrenia in male patients in a relatively small group, due to sex differentiation and accurate application of Annett’s sophisticated method. We suggest to use the methodology of this preliminary study in a much larger sample of schizophrenic patients, possibly detecting differences of MH in schizophrenia subtypes, further evaluating the prognostic value of this property in follow-up studies, and presumably finding relevant differences in neuroimaging.

Key points

- Schizophrenics appear to exhibit a shift away from dexterity, as confirmed by the literature
- Quite a few of these positive studies have distinguished between left-handedness and mixed-handedness (MH), thus lacking specificity
- Prior studies failed to specify schizophrenic MH
- We observed a significant relationship between strong MH and schizophrenia in male patients in a relatively small group
- This was due to sex differentiation and accurate application of Annett’s hand preference questionnaire

Financial disclosure

Nothing to disclose!
References


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