

Startle gating in antipsychotic-naïve first episode schizophrenia patients: One ear is better than two

Veena Kumari^{a,b,*}, Dominic Fannon^b, Alexander L. Sumich^b, Tonmoy Sharma^c

^a Department of Psychology, Institute of Psychiatry, King's College London, London, UK

^b Section of General Psychiatry, Division of Psychological Medicine, Institute of Psychiatry, King's College London, London, UK

^c Clinical Neuroscience Research Centre, Dartford, Kent, UK

Received 30 March 2006; received in revised form 18 September 2006; accepted 20 September 2006

Abstract

Prepulse inhibition (PPI) of the startle reflex to binaural prepulse stimuli is reliably reported to be reduced in patients with schizophrenia. Monaural acoustic prestimuli produce more inhibition of the eye blink reflex than binaural prestimuli in healthy people. The effect of monaural prestimulation on reflex inhibition in patients with schizophrenia is not known. In this study, inhibition of the acoustic startle response by monaural and binaural acoustic prestimuli was assessed in 20 antipsychotic-naïve first episode schizophrenia patients and compared with 20 age and sex-matched healthy subjects. The results revealed less PPI, especially with binaural prestimuli, in patients than healthy subjects but both groups showed more PPI with monaural than binaural prestimuli. It is concluded that first episode schizophrenia patients show deficient sensorimotor gating but they are not impaired in the mechanism underlying stronger PPI with monaural than binaural prepulses.

© 2006 Elsevier Ireland Ltd. All rights reserved.

Keywords: Startle; Prepulse inhibition; Monaural; Binaural; Schizophrenia; EMG

1. Introduction

The magnitude of the human eye blink reflex to a strong startle-eliciting sensory stimulus, the pulse, is reduced if this is preceded shortly by a weak prestimulus, the prepulse (Graham, 1975). This effect, known as prepulse inhibition (PPI), has been shown to be reliably reduced in schizophrenia patients (Braff et al., 1978,

review, 2001; Kumari et al., 2005a; Ludewig et al., 2003; Meincke et al., 2004) especially in the presence of thought disorder (Perry and Braff, 1994; Perry et al., 1999). Monaural acoustic prestimuli produce more inhibition of the blink reflex than binaural prestimuli in healthy people (Marsh et al., 1976; Kumari et al., 2005b) and unaffected relatives of patients with schizophrenia (Kumari et al., 2005b). The effect of monaural prestimulation on startle inhibition in schizophrenia is not known.

Schizophrenia has been considered to involve left hemisphere dysfunction (Crow, 1995; Gruzelier, 2002). Empirical studies have shown deficient left hemisphere M50 gating (Thoma et al., 2003), normal functioning of the right auditory cortex but abnormalities of the left auditory cortex in an auditory paired-stimuli paradigm

* Corresponding author. PO 78, Institute of Psychiatry, De Crespigny Park, London SE5 8AF, UK. Tel.: +44 207 848 0233; fax: +44 207 848 0860.

E-mail address: v.kumari@iop.kcl.ac.uk (V. Kumari).

(Clementz et al., 2003), disturbed P300 topography with right ear stimulation (Bolsche et al., 1996), failure of dominant left-hemisphere activation to right ear stimulation (Rockstroh et al., 1998), and smaller right ear advantage for dichotic fused words (Bruder et al., 1995; Loberg et al., 1999). Furthermore, a number of studies have demonstrated that normal brain asymmetry at the structural and functional level is lost or even reversed in patients with schizophrenia (e.g. Bilder et al., 1999; Petty, 1999; Sharma et al., 1999; Aydin et al., 2001; Rockstroh et al., 2001; Kircher et al., 2002; Jin et al., 2003). Importantly, the regions found to show abnormal lateralization in this population include the hippocampus and the temporal lobes (e.g. DeLisi et al., 1989; Russell et al., 1997; Maher et al., 1998; Shirakawa et al., 2001; Hanlon et al., 2005) which are known to be involved in PPI from both animal (review, Swerdlow et al., 2001) and human studies (Kumari et al., 2003a, 2005c).

In this study, we examined the effect of monaural and binaural prestimuli on startle inhibition in antipsychotic-naïve first-episode schizophrenia patients and matched controls. We hypothesised that patients, compared to controls, would show reduced PPI and, given previous data indicating left hemisphere dysfunction, this deficit might be most pronounced with right ear prestimulation. The use of antipsychotic-naïve patients allowed us to examine these issues free from effects that antipsychotics might exert on PPI (e.g. Kumari et al., 1999, 2000, 2002, 2006; Leumann et al., 2002; Oranje et al., 2002, 2004; Quednow et al., 2006) and functional lateralization of certain brain regions (Merrin et al., 1988; Bertolino et al., 2004).

2. Methods

2.1. Subjects

Participants, all right-handed, included 20 patients diagnosed with schizophrenia (SCID-P; First et al., 1996; re-confirmed after 1 year) and within three months of their first psychotic episode and 20 sex- and age-matched healthy subjects screened for exclusion of mental illness and neurological abnormalities. No participant had current alcohol and drug abuse, a positive history of alcohol and drug dependence in the last year or lifetime history of 5 years of alcohol or drug abuse/dependence, or head injury. Table 1 shows clinical and demographic characteristic of both groups.

The study procedures were approved by the Ethical (Research) Committee of the Institute of Psychiatry, London. All subjects gave written informed consent.

2.2. Psychophysiological data collection

The eyeblink startle response was indexed by recording electromyographic (EMG) activity of the right orbicularis oculi muscle by positioning two miniature silver/silver chloride electrodes (4 mm) filled with Dracard electrolyte paste (SLE, Croydon, UK). The ground electrode was attached on the right mastoid. Data were collected with participants sitting comfortably in a moderately lit laboratory. A commercial computerized human startle response monitoring system (Mark II, SR-Lab, San Diego, California) was used to deliver acoustic startle stimuli, and record and score the EMG activity. The startle system recorded EMG activity for 250 ms (sample interval 1 ms) from the onset of the pulse stimulus. The amplification gain control for EMG signal was kept constant for all participants. Recorded EMG activity was band-pass filtered, as recommended by the SR-Lab. Analogue bandpass filtering occurred before digitizing. The high-pass and low-pass cut-off frequencies were set at 100 Hz and 1 kHz, respectively. A 50-Hz notch filter was used to eliminate the 50-Hz interference. EMG data were scored off-line by the analytic programme of this system for response amplitude and latencies to peak (in ms). The scoring program contained a rolling average routine which smoothed the rectified EMG response. Response onset was defined by a shift of 7.63 μ V from the baseline value occurring within 20–120 ms from the onset of startle stimulus. The baseline value consisted of the average of the minimum and maximum values recorded during the first 18 ms. The latency to response peak was defined as the latency to the point of maximal amplitude that occurred within 18–120 ms from the onset of startle stimuli.

The session began with a 5-min acclimatization period consisting of 70 dB (A) continuous white noise. The pulse-alone stimulus was a 40-ms presentation of 115 dB (A) SPL white noise and the prepulse stimulus a 20-ms presentation of 85 dB (A) SPL white noise, both over

Table 1
Demographics and clinical characteristics

	Patients mean (S.D.)	Healthy subjects mean (S.D.)
Age (years)	24.55 (5.60)	27.30 (4.40)
Sex distribution	17 men, 3 women	17 men, 3 women
*Positive symptoms	21.15 (5.29)	
*Negative symptoms	19.55 (4.31)	
*General psychopathology	39.05 (7.17)	
*Total PANSS score	79.75 (13.39)	

*Positive and Negative Syndrome Scale (PANSS; Kay et al., 1987).

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات