Persistent auditory hallucinations and treatment challenges

Despite improved neurotransmitter identification and emergence of novel antipsychotics, treatment of auditory hallucinatory experiences is frustrating. Interest has developed in non-pharmacological approaches to this problem – these do not eliminate the voices but reduce the distress associated with the experience.

Auditory verbal hallucination is a symptom of a complex psychopathology. Third-person auditory hallucinatory experiences are a first-rank Schneider schizophrenia symptom, and most manifestations involve variable verbal utterances. Auditory verbal hallucination features in 75% of schizophrenia sufferers, 20–50% of bipolar patients, 10% of major psychotic depressives and 40% of those with post-traumatic stress disorder (Choong et al, 2007; *Table 1*). Studies show that 2.3% of non-psychiatric subjects experience auditory verbal hallucinations (Azuonye, 1997; Choong et al, 2007). Clinical auditory verbal hallucinations are distinguishable from auditory illusions, auditory imagery and abnormal beliefs; people experiencing non-clinical auditory verbal hallucinations report positive content, less frequency, greater control over voices and less interference with their lives (Honig et al, 1998). Their features are displayed in *Table 2*. Psychotic auditory verbal hallucination causes extreme distress and severe cognitive restriction.

Auditory hallucinatory experiences include elementary hallucinations, hearing voices, hearing one's own thoughts aloud, and commenting and commanding hallucinations. Voices may be of either or no gender; and child, adult, human or non-human. If voices are multiple, one often dominates. Experience through the ears, in the head, on the skin or in the environment is reported. A voice may vocalize the patient's thoughts as he/she thinks, or afterwards, and sometimes the voice speaks what is about to be said, creating an echo-chamber effect. The technically minded may correlate the sound with that of an old gramophone needle that is

Table 1. Clinical and non-clinical conditions with auditory verbal hallucinations

Clinical auditory verbal hallucinations	Schizophrenia
	Schizoaffective disorders
	Bipolar disorders
	Psychotic depression
	Post-traumatic stress disorder
	Following traumatic experiences
	Bereavement
	Dissociative disorders
	Organic hallucinations
Non-clinical auditory verbal hallucinations	Sensory deprivation
	High emotion situations
	Severe sleep deprivation
	Caffeine intoxication

Table 2. Characteristics of clinical and non-clinical auditory verbal hallucinations

Clinical auditory verbal hallucinations	Greater linguistic complexity with limited vocabulary
	Greater emotional response
	Location of voice outside head
	Higher frequency of hallucinatory experiences
	Patients believe that their experiences are shared
	Interference with activities and mental functions
	Delusion formation correlated with auditory verbal hallucinations
	More negative than positive content
	Long duration
	Urge to respond audibly to the voices
	Voices may build up slowly or manifest spontaneously
	Wane off gradually
Non-clinical auditory verbal hallucinations	Higher incidence of positive content
	Less frequency
	Higher control over the voices
	Less interference with the patient's activities and mental functions
	Short duration
	Sometimes voices demonstrate better vocabulary than that of the hearer
	Voices try to offer new information to the hearer as proof of their reliability
	Voices manifest spontaneously
	Voices may stop suddenly with or without warning

Dr James P Pandarakalam *is Locum Consultant Psychiatrist, 5 Boroughs Partnership NHS Foundation Trust, Hollins Park Hospital, Warrington WA2 8WA (jpandarak@hotmail.co.uk)*

skipping. Mood-congruent auditory hallucinatory experiences may be characterized by severe depression, feelings of worthlessness and suicidal tendencies, while positive voice hearers may miss their auditory verbal hallucination when treated successfully (Copolov et al, 2004).

Hallucinatory contents

Auditory verbal hallucination subjects find their experiences more real than physical reality. The form is identical in all cultures but the content varies – this has significance for patient management. The symptoms are clues to diagnosis. When abstract thinking is poor, the content poses more risks; often it is negative – commanding auditory verbal hallucinations are more distressing than commenting ones; and current social and political issues are reflected in the particulars of auditory verbal hallucinations. The details of auditory verbal hallucinations vary according to the educational and intellectual background of the subject. The contents of auditory verbal hallucinations are commonly classified as follows:

1. Paranormal, e.g. telepathy, clairvoyance
2. Spiritual or ancestral spirits
3. Mental illness
4. Psychological
5. Cultural artefact
6. Subliminal messaging
7. Mystical ideas or divine communications
8. Esoteric and philosophical
9. Negative entities
10. Angelic beings or saints
11. Extraterrestrials
12. Hi-tech interventions.

Therapists must be fully attuned or neutral to patients in order to treat them, and enquiries about the topography of the voices are required (*Table 3*). Frequently the content is negative, featuring derogation or commands to take undesirable action. The content varies over time, reflecting social and cultural changes. People seem to require an identity in order to fix their ideas, and hearers tend to attribute auditory verbal hallucinations to familiar situations. For instance, in the 1960s auditory verbal hallucinations tended to focus on Russian invasion, in the 1980s on aliens, and in the 21st century on microchips. It is fruitless and counter-therapeutic to dismiss mistaken interpretations altogether; again neutrality may be needed.

Table 3. Different dimensions of auditory hallucinations

Intensity, duration, frequency
Accompanying thoughts
Physical characteristics
To whom or what voices are attributed
The source of the voices according to the patient
The level of control and power of voices
Positive or negative
Supportive, neutral or hostile
Verbal or non-verbal
Attention salience

Paranormal interpretations should be carefully discouraged; they are risky given the poor abstract thinking of patients with schizophrenia. For instance, even astrophysical interpretations may be dangerous: one patient believed that multi-universes existed and made an unsuccessful suicide attempt, in response to command hallucinations, to get through a black hole into a parallel universe. Supposed voices of aliens threatening abduction may be extremely alarming – sufferers have declared that they would rather die than be abducted. Persecutory auditory hallucinatory experiences and delusions are potentially lethal in combination.

Command hallucinations

Command auditory verbal hallucinations – for example, 'Lie down on the railway line', 'Shave off your hair and eyebrows', 'Kill yourself and fly with us' – are more distressing than commenting ones. There is a high incidence of auditory verbal hallucinations in command hallucinations among forensic populations, requiring cautionary management. Obedience to commands may be predicated by the patient's belief about the auditory verbal hallucination rather than the content of the hallucination (Hacker et al, 2008).

Patients are usually ambivalent about their interpretation of the voices. The degree of fear, acceptance and compliance may be mediated by beliefs about the voices' power and authority (Chadwick and Birchwood, 1994). The perception that the voices are uncontrollable may be exacerbated by the sufferer's emotional state, which increases the frequency and severity of the voices in a cyclical relationship. At this point, patients may self-medicate by starting to abuse alcohol and drugs; that adversely increases the voices' severity and prevents sufferers from abandoning the view that the voices are uncontrollable.

When voices are perceived as omnipotent and uncontrollable, they promote a higher level of impulsiveness; hearers may envisage themselves as in a relationship with their voices and that the latter outrank them (Birchwood et al, 2004). When voices are perceived as omnipotent, patients feel threatened, believing that the voices know their private thoughts. Individuals are more likely to comply with the commands if they recognize that the auditory verbal hallucination is associated with a hallucination-related delusion. Malevolent voices are unwelcome and provoke negative emotions such as anger, fear, depression and anxiety; benevolent voices are welcome and generate positive emotions – amusement, reassurance, calm and happiness.

Early symptoms

Most investigators have focused on overt auditory hallucinatory experiences, but subtle disturbances of subjectivity preceding the florid hallucinatory state have been observed. Auditory hallucinatory experiences are psychopathological end-points; to achieve early detection and prevention, investigation should be directed at the prodromal period – by analogy, studying a diabetic ulcer will not help the understanding of hyperglycaemia. However, patients and those close to them are unlikely to cooperate with early psychiatric investigation.

Disturbances in the stream of consciousness may herald auditory verbal hallucination symptoms. Thought pressure, interference and/or block, obsessive perseveration and failure to discriminate between thought and perception are precursors (Klosterkötter, 1992). The gap between the sense of self and the flow of consciousness becomes wider as the latent stage progresses. In the late prodromal stage, before the hallucinatory experience emerges, the inner speech becomes more and more objectified, spatially localized and externally perceived (Saas and Parnas, 2003). The Bonn Scale (BSABS) for the assessment of basic symptoms (Gross et al, 2008), the Schizophrenia Proneness Instrument (SPI-A; Schulze-Lutter et al, 2007) and the Examination of Anomalous Self Experience (EASE; Parnas et al, 2005) are useful as aids to identifying minimal changes in subjective experience and also for longitudinal monitoring.

The mechanism of auditory hallucinatory experiences

Personalized content, subjective experiences, interpretational process, physiological reactions and behavioural responses are notable auditory verbal hallucination components. Auditory hallucinatory experiences often consist of speech linked with activation of the neural circuitry underlying speech perception. Neurons in the Broca and Wernicke brain nuclei are thought to fire when patients experience auditory verbal hallucinations, but the mechanism is unclear. Two lines of research are current: exploring neuro-anatomical networks using techniques such as positron emission tomography and functional magnetic resonance imaging; and focusing on cognitive and psychological processes and events involved in auditory verbal hallucination.

A study using transcranial magnetic stimulation indicates that the mechanism of auditory hallucinatory experiences may involve activation of the left temporo-parietal cortex (Hoffman et al, 2003). A neurocognitive model of the hallucinating brain has also been suggested (Waters et al, 2006a). Auditory hallucinatory experiences may arise because of an interaction between perceptual, cognitive and biological vulnerability along with affective factors and contextual influences (Waters et al, 2006b). Vulnerability to hallucinatory experiences in psychotic patients is thought to have a genetic predisposition (Aguilar et al, 2008).

Hallucinogenic drugs, anti-hallucination medication and neuroimaging studies promote better understanding. The most commonly accepted mechanism is D_2 and $5H_{2A}$ receptor blockade; increased D_2 occupancy in the striatal system and 5-HT_{2A} receptor occupancy in the caudate nucleus have been demonstrated through neuroimaging (Hurlemann et al, 2008). Magnetic resonance spectroscopy has detected choline and N-acetyl aspirate ratio abnormalities in the thalamus correlating with the pathogenesis of the auditory hallucinatory experience (Martinez-Granados et al, 2008). The commonalities between inner speech and auditory verbal hallucination are noteworthy. Clinical auditory verbal hallucination is a dynamic, emotionally charged experience, perhaps an epiphenomenon of a deeper psychophysiological and psychodynamic process; voices often echo emotional states. Auditory hallucinatory experiences contain several neurological artefacts.

Several treatments are available to eliminate or ameliorate auditory hallucinatory experiences, of which drug treatment predominates. Non-pharmacological tools are appropriate for long-term management of refractory cases. Different forms of intervention are listed in *Table 4*.

Drug treatment

Antipsychotics are potentially antidelusional and antihallucinatory but have limited individual clinical efficacy; they may make auditory verbal hallucinations bearable but must be used cautiously. Comparisons of efficacy are few, but conventional and atypical antipsychotics have antihallucinatory effects. Benzodiazepines are often abused by voice hearers to reduce anxiety. Although there is little validation of this, trifluperazine was once thought to be effective. Clozapine is currently favoured for intractable auditory hallucinatory experiences. It is beneficial in 30–60% of unresponsive patients; it may not negate the voices, but it helps in dealing with auditory hallucinatory experiences. The insight gained by patients who take clozapine has helped to elucidate many aspects of auditory hallucinatory experiences. If a clozapine derivative without its

Table 4. Treatments for auditory hallucinations

Drug treatment: conventional and atypical antipsychotics, anxiolytics
Cognitive behavioural therapy
Hallucination focussed integrative therapy
Acceptance and commitment therapy
Attention training technique
Competitive memory training
Distraction techniques
Transcranial magnetic stimulation (clinical trials)
Sound therapy (clinical trials)

haematological side effects were discovered, it would become the first line of treatment for schizophrenia, and would halt the development of persistent auditory verbal hallucination in a number of subjects. However, 30% of clozapine-treated patients remain unresponsive – clinicians have to lower their expectations for these patients regarding the outcome of treatment. Auditory hallucinatory experiences may be controlled by non-pharmacological intervention.

Treatment-resistant auditory verbal hallucinations must be considered as separate entities; they may persist after other positive symptoms have been corrected, causing distress to patients and carers. They may also engender disappointment with the individual medication regimen, putting clinicians under pressure to find alternative medication.

Auditory verbal hallucination is considered a predictor of poor prognosis in schizophrenia; 50% of patients receiving antipsychotics gain full remission, 25% hear voices occasionally and 25% are unresponsive (Gonzales et al, 2006). Persistent auditory hallucinatory experiences alone may not warrant alteration of medication, and non-pharmacological interventions may achieve control. False assumptions about treatment-resistant psychosis abound. These include intolerance to a specific drug, poor compliance with medication, inappropriate dosage and insufficient time in treatment. Because some clinicians are poorly informed about non-pharmacological therapies, patients who suffer auditory verbal hallucinations and who are unresponsive to antipsychotics may be mistakenly labelled as having refractory auditory verbal hallucination; they may respond instead to an integrated approach. Taking all the factors into account, the true prevalence of treatment resistance may be below 40%.

Criteria for therapy resistance are derived from Kane et al's (1988) comparative study of chlorpromazine and clozapine in treating auditory verbal hallucinations. Treatment of schizophrenic symptoms with two atypical antipsychotics over 4–6 weeks without definite response indicates treatment-refractory schizophrenia. For such patients, clozapine 300–900 mg/day, risperidone 4–6 mg/day, olanzapine 10–20 mg/day, quetiapine 300–600 mg/day or aripiprazole 15–30 mg/day has been advised (Kinon et al, 2004; Elkis, 2007). Those not responding to clozapine may be classed as super-refractory (Elkis, 2007). Olanzapine at higher doses may have D_2 properties. Mood enhancers such as antidepressants may lift the mental resources of patients, helping them to cope better with the voices. Early onset of illness, male gender and multiple inpatient treatments have been observed in super-refractory cases of schizophrenia (Henna et al, 1999). There remains an unmet clinical need for efficacious drug treatment for refractory auditory verbal hallucinations; animal models of hallucinations and pharmacogenetics may help in finding them.

Psychological treatments

Most forms of psychological intervention are interlinked. The procedures in auditory verbal hallucination control techniques are based on firmly established findings from experimental psychology. Many new psychological treatments lack clinical validity, but there are several ongoing studies evaluating their efficacy, using control groups in randomized trials. Self-help groups are becoming popular, aided by the internet; the ethos of recovery in voice-hearing groups is understanding, accepting and integrating the sufferer's turmoil. Establishing and maintaining a therapeutic relationship with voice hearers is a demanding task (Jenner, 2002); success lies in creating a working reality, not in imposing a dogmatic reality on patients. The Socratic or Elenchus interviewing style is more productive than confrontation and interpreting (Chadwick et al, 1996).

In the Hearing Voices Movement, voices are considered as messengers communicating important information about genuine problems and emotional traumas, so extinguishing them would be counter-productive (Laroi and Alman, 2010). However, clinical auditory verbal hallucinations may be pseudo-messengers and often the voices originate in the depths of the unconscious mind – sufferers should be given help to silence them.

Cognitive behavioural therapy

Among the psychological control techniques of auditory verbal hallucination, cognitive behavioural therapy ranks at the top and is well researched. As cognitive dysfunctions have been noticed in auditory verbal hallucination, cognitive remediation strategies have been trialled with partial success. Patients' appraisal of the voices determines their emotional and behavioural reaction to them (Romme and Escher, 1989). If the voice hearer ascribes authority and power to the voice, he/she reacts with anxiety and fear, whereas if the hearer thinks it is self-generated, that reaction is unlikely (Chadwick and Birchwood, 1994, 1995). Often voice-related distress is mediated by belief about voice omnipotence. Cognitive behavioural therapy is targeted at emotional and behavioural changes, not symptom changes; cognitive and behavioural techniques have been designed to teach how to modify the frequency of auditory hallucinatory experiences and restore a sense of control over them. The aims of cognitive behavioural therapy are as follows:

1. Change false beliefs about auditory verbal hallucination, e.g. they are omnipotent, uncontrollable; they are attributed false identities, wrong intentions; they harm oneself and others
2. Challenge irrational interpretations
3. Modify maladaptive behaviour, e.g. fear of the voices or hiding from them
4. Divert attention, using distraction techniques.

Reality testing and behavioural experiments are among the cognitive behavioural interventions used and involve

taking action. Behavioural change may be the best way to effect cognitive change. Attention switching may be used to challenge the belief that hallucinations are uncontrollable; if it achieves attenuation of the intensity of hallucinatory experience, then the belief of uncontrollability can be challenged.

Cognitive behavioural therapy practitioners suggest that auditory verbal hallucinations may be interpreted as internal speech or thought that is incorrectly identified; if so the process by which the brain is able to identify thoughts as its own is malfunctioning. Conveying this idea to patients is challenging. Experiments to demonstrate to and convince voice sufferers have been proposed (Hoffmann and Tompson, 2002). Patients are informed about the possibility of hallucinations being internal rather than external. They are asked to cooperate in the experiment by closing their eyes and raising their right hand above their shoulder, and then try to locate their right arm. When they manage this, it is pointed out that they are able to do so although they cannot see the arm because of the feedback mechanism inside their body that allows their brain to recognize where it is. They may be told that if the feedback mechanism became dysfunctional, they would not be able to respond correctly and might assume that an external force was touching their arm; further, such a malfunctioning would take place with their voices and thoughts so they would misconstrue auditory verbal hallucinations as originating from an external reality.

In a group of 38 patients, Trower et al (2004) observed a weakening of conviction about the power and superiority of voices and significant reduction in compliance behaviour following cognitive therapy, but there was no change in the voice topography. Voice therapy through cognitive behavioural therapy may not achieve voice reduction, but it helps to reduce the associated distress. When conviction in the belief of voices falls, patients experience a sense of liberation and enjoy improved social activity.

Emerging treatments

On the assumption that auditory hallucinatory experiences are a brain excitability syndrome, transcranial magnetic stimulation, a non-invasive method of altering the excitability of the brain, has been used. Several studies with repetitive transcranial magnetic stimulation have shown improvement in the frequency of auditory hallucinatory experiences, but no firm conclusion may be reached (Hoffman et al, 2005). Moderate rates of auditory verbal hallucination attenuation in response to repetitive transcranial magnetic stimulation have been noted in three meta-analyses and remarkable improvement in isolated cases has been claimed, indicating that there may be repetitive transcranial magnetic stimulation responders. Transcranial magnetic stimulation is targeted at auditory–verbal processing areas. The studies may indicate that transcranial magnetic stimulation is effective in reducing the frequency of auditory verbal hallucination but not necessarily other topographical aspects (Hoffman et al, 2005).

Kaneko et al (2010) report successful intervention in two cases of refractory auditory verbal hallucination with sound therapy using a tinnitus control instrument alongside antipsychotic medication. Subjective tinnitus is defined as the false perception of sound in the absence of acoustic stimuli. As tinnitus and auditory hallucinatory experiences coexist in many schizophrenics, a common neuro-mechanism for them has been proposed (Dolberg et al, 2008). In tinnitus, the brain interprets an internally generated electromagnetic signal as an acoustic sound or sounds; a similar process may account for auditory hallucinatory experiences. In veridical sound, vibration of air molecules is converted into neuro-chemical signals; auditory hallucinatory experiences have their own physics. Kaneko et al (2010) treated two cases with a tinnitus control instrument alongside atypical antipsychotics, and claimed full remission of auditory hallucinatory experiences after 17 and 30 months respectively. The tinnitus control instrument may reduce the intensity and frequency of auditory verbal hallucination, and even that outcome may be a useful aid to cognitive behavioural therapy in challenging the belief that the voices are all powerful (because they can be tampered with by a mechanical device). To reduce distress associated with auditory verbal hallucination and help sufferers cope with hallucinatory predilection, transcranial magnetic stimulation and a tinnitus control instrument could be combined with cognitive behavioural therapy.

Conclusions

Conversing with the empty air, and shouting and punching at it, were frequent events in asylums. Thanks to modern treatment strategies and drug regimens, such sights are now uncommon – many untoward incidents caused by command auditory verbal hallucinations have been averted. Medication helps to protect the dignity of patients. However, an excessively biological view of auditory hallucinatory experiences may make patients feel that they can do nothing but take medication. Clinicians may feel the same, and that would engender in clinicians a self-justifying attitude towards prescribing. From the patient's perspective, the calming and relaxing effects of pharmacological therapies are a priority for relief from the distress caused by auditory verbal hallucination.

As auditory hallucinatory experiences are multifaceted, treatment should be individual and clinicians should be prepared to use several clinical and non-clinical strategies simultaneously (Laroi and Alman, 2010). Optimizing compliance, reducing the burden of symptoms, and improving control, quality of life and social functioning should be the therapeutic goals. The conventional belief that treatment of schizophrenia is effective only for as long as the drugs are active (McGlashan, 1988) also applies to cases of refractory auditory verbal hallucina-

tion, which makes the outcome of treatment unpredictable. The prevalence of non-clinical auditory hallucinatory experiences is evidence of the existence of a symptomatic continuum between the clinical and non-clinical ones (Verdoux and Van Os, 2002), and the study of non-psychiatric auditory hallucinatory experiences may help to elucidate the psychopathology of psychotic auditory hallucinatory experiences (Choong et al, 2007). BJHM

Conflict of interest: none.

Aguilar EJ, Sanjuan J, García-Martí G, Lull JJ, Robles M (2008) MR and genetics in schizophrenia: focus on auditory hallucinations. *Eur J Radiol* **67**: 434–9

Azuonye IO (1997) A difficult case: Diagnosis made by hallucinations. *BMJ* **315**: 1685

Birchwood H, Gilbert P, Gilbert J et al (2004) Interpersonal and role-related schema influence thee relationship with the dominant voice in schizophrenia: a comparison of three models. *Psychol Med* **34**: 1–10

Chadwick P, Birchwood M (1994) The Omnipotence of Voices: a cognitive approach to auditory hallucinations. *Br J Psychiatry* **164** (Suppl): 190–201

Chadwick P, Birchwood M (1995) The Omnipotence of Voices ii: the beliefs about voices questionnaire. *Br J Psychiatry* **166**(Suppl): 773–6

Chadwick P, Birchwood M, Trower P (1996) *Cognitive Therapy for Delusions, Voices and Paranoia.* John Wiley and Sons, Chichester

Choong C, Hunter MD, Woodruff PW (2007) Auditory hallucinations in those populations that do not suffer from schizophrenia. *Curr Psychiatry Rep* **9**: 206–12

Copolov D, Trauer T, Mackinnon A (2004) On the non-significance of internal versus external auditory hallucinations. *Schizophr Res* **69**(1): 1–6

Dolberg D, Schaaf H, Hesse G (2008) Tinnitus in primarily schizophrenia patients. *HNO* **56**: 719–26

Elkis H (2007) Treatment Resistant Schizophrenia. *Psychiatr Clin N Am* **30**: 511–33

Gonzales JC, Anguilar EJ, Berenguer V, Leal C, Sanjuan J (2006) Persistent Auditory Hallucinations. *Psychopathology* **39**: 120–5

Gross G, Hubler G, Klosterkötter I, Linz M (2008) *Bonn scale for the assessment of basic symptoms.* Shaker Verlag GmbH, Germany

Hacker D, Birchwood M, Tudway J, Meaden A, Amphlett C (2008) Acting on voices: omnipotence sources of threat, and safety seeking behaviours. *Br J Clin Psychol* **47**: 201–13

Henna J, Oliveria JR, Mello MF et al (1999) Predictors of response and outcome in treatment resistant versus non-treatment resistant schizophrenic patients. *Schizophr Res* **36**: 281–2

Hoffmann SG, Tompson MC (2002) *Treating Chronic and Severe Mental Disorders.* Guildford Press, London

Hoffman RE, Hawkins KA, Gueorguieva R et al (2003) Transcranial magnetic stimulation of left temporoparietal cortex and medication resistant auditory hallucinations. *Arch Gen Psychiatry* **60**: 49–56

Hoffman RE, Gueorguieva R, Hawkins KA et al (2005) Temporoparietal transcranial magnetic stimulation for auditory hallucinations: Safety, efficacy and moderators in a fifty patient sample. *Biol Psychiatry* **58**: 97–104

Honig A, Romme MA, Ensink BJ et al (1998) Auditory Hallucinations: a comparison between patients and non patients. *J Nerv Mental Dis* **186**: 646–51

Hurlemann R, Matusch A, Kuhn KU et al (2008) 5HT2A receptor density is decreased in the at-risk mental state. *Psychopharmacology* **195**: 579–90

Jenner JA (2002) An integrative treatment for patients with persistent auditory hallucinations. *Psychiatr Serv* **53**: 897–8

Kane J, Honingfield G, Singer J, Meltzer H (1988) Clozapine for the treatment-resistant schizophrenic. A double-blind comparison with chlorpromazine. *Arch Gen Psychiatry* **45**: 789–96

Kaneko Y, Oda Y, Goto F (2010) Two cases of intractable auditory hallucination successfully treated with sound therapy. *Int Tinnitus J* **16**(1): 29–31

Kinon BJ, Ahl J, Stauffer VL., Hill AL, Buckley PF (2004) Dose response and atypical antipsychotic in schizophrenia. *CNS Drugs* **18**: 597–616

Klosterkötter J (1992) The meaning of basic symptoms for the genesis of schizophrenic nuclear syndrome. *Jpn J Psychiatry Neurol* **46**: 609–30

Laroi F, Alman A (2010) *Hallucinations, a guide to Treatment and Management.* Oxford University Press, Oxford

McGlashan TH (1988) A selective review of North American long term follow up studies of schizophrenia. *Schizophr Bull* **14**: 515–42

Martinez-Granados B, Brotons O, Martinez-Bisbal MC et al (2008) Spectroscopic metabolomic abnormalities in the thalamus related to auditory hallucinations in patients with schizophrenia. *Schizophrenia Res* **104**: 13–22

Parnas I, Moller P, Kircher T et al (2005) EASE: Examination of anomalous self-experience. *Psychopathology* **38**: 236–58

Romme M, Escher A (1989) Hearing Voices. *Schizophr Bull* **15**(2): 209–17

Saas LA, Parnas J (2003) Schizophrenia, consciousness and the self. *Schizophr Bull* **29**: 427–44

Schulze-Lutter F, Addington I, Ruhrmann S, Klosterkötter J (2007) *The schizophrenia proneness instrument (SPI-A).* Giovanni Fioritti, Rome

Trower P, Birchwood M, Meaden A, Byrne S, Nelson A, Ross K (2004) Cognitive therapy for command hallucinations: randomised controlled trial. *Br J Psychiatry* **184**: 312–30

Verdoux H, Van Os J (2002) Psychotic symptoms in non-clinical populations and the continuum of psychosis. *Schizophr Res* **54**: 59–65

Waters FA, Badcock JC, Maybery MT (2006a) The 'who' and 'when' of context memory; different patterns of association with auditory hallucinations. *Schizophr Res* **82**: 271–3

Waters FA, Badcock JC, Michie PT, Maybery MT (2006b) Auditory hallucinations in schizophrenia: intrusive thoughts and forgotten memories. *Cogn Neuropsychiatry* **11**: 65–83

KEY POINTS

- Clinical auditory hallucinations are most often associated with psychiatric disorders like schizophrenia, bipolar disorders, major psychotic depression, but evidence suggests that non-clinical auditory hallucinations exist. Persistent third person auditory hallucinations are most often associated with refractory schizophrenia.
- The precise aetiological mechanism of auditory hallucinations is unclear. They have a neurophysiological substratum.
- The belief about the voices determines the intensity of distress associated with auditory hallucinations.
- Command hallucinations have serious forensic significance.
- Antipsychotics have only modest anti-hallucinatory effects, with clozapine the most effective.
- Different forms of psychological therapies are being developed to cope with auditory verbal hallucinations. Cognitive behavioural therapy is the most popular form of psychological intervention and is practised in combination with different forms of distraction techniques.