

four Special Hospitals which provide a national service at a maximum level of security and in the network of Regional Secure Units which provide a medium level of security and additional specialist services to their catchment areas. The paper examines the characteristics of patients with personality disorder who were assessed by the sub-regional forensic psychiatry service in East London. This geographical area is characterised by especially high levels of social deprivation and high crime rates.

The service has developed to prioritise severely mentally ill and patients requiring inpatient services. Over 1,000 patients were assessed during the study period, of whom half suffered from schizophrenia. Personality disorder was considered the primary psychopathology in an additional 25%. The most prevalent diagnoses were antisocial and borderline personality disorder which demonstrated comorbidity with lifetime depressive disorder and substance abuse. Subjects exhibited a wider range of offending behaviour than the severely mentally ill, whose offences appeared to be concentrated in the most serious categories of violence. Personality disordered patients were more likely to be younger, caucasian, and born in the U.K. They were more likely to be referred by Probation Officers and lawyers than prison medical staff and local general psychiatrists who referred the mentally ill. Only a small proportion were subsequently accepted for admission to inpatient facilities.

These findings are thought to be broadly representative of other local forensic psychiatry services in the U.K. where previous research has demonstrated that the assessment and treatment of personality disorder is not a priority. The findings suggest that personality disordered individuals who are admitted to medium secure units are likely to be highly selected and unrepresentative samples. These findings have implications for future research into personality disorder in maximum and medium secure services in the U.K.

SEROTONERGIC FUNCTION IN PERSONALITY DISORDERED OFFENDERS

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Evidence of reduced central serotonin (5-HT) in the mediation of aggression and impulse control comes from both behavioural and correlative studies. CSF 5-hydroxyindoleacetic acid 5-HIAA has been shown to correlate inversely with irritability and hostility, aggression and criminality in normal and patient populations. Studies examining neuroendocrine responses to pharmacological challenge in aggression are few in number, disparate in the nature of the challenging agent, and inconsistent in their findings. Overall, however, the data suggest an important role for the serotonergic modulation of suicidality and aggression, consistent with previous studies utilising CSF and peripheral blood indices of 5-HT function.

This study provides a preliminary report on prolactin (PRL) responses to a 30 mg dose challenge with d-fenfluramine in 58 male drug free personality disordered (PD) offenders detained in a maximum security psychiatric facility and 16 non-patient controls recruited from staff in the same institution. Controls were screened for a personal or family history of mental disorder on the basis of a semi-structured interview. Major medical illness was ruled out in patients and controls by physical examination and laboratory tests. Participants completed a battery of psychometric assessments of impulsivity and aggression. Following insertion of an intravenous cannula subjects followed a standard neuroendocrine protocol in which blood samples were obtained hourly until 300 minutes post challenge. A subgroup also received a placebo challenge. PRL responses were assessed using the area under the curve corrected for baseline (+60 mins).

{Fenfluramine stimulates release and blocks reuptake of 5-HT and results in a temporary increase in 5-HT in the synaptic cleft. It acts as

a potent stimulator of PRL through the limbic-hypothalamic-pituitary axis}.

All patients met DSM-III-R criteria for PD. Fifty were classed as psychopathic (high impulsivity/aggression scores) and 6 as non-psychopathic or inhibited (low impulsivity/aggression scores) on the Special Hospital Assessment of Personality and Socialisation (SHAPS).

Analysis of variance for repeated measures revealed a significant drug by time effect ($F = 9.34, p < 0.001$). Significant differences between SHAPS categories were observed ($F(2,71) = 5.5, p < 0.01$). Post hoc testing revealed lower mean responses in psychopathic patients (91.2 mIU.h/L) compared with the inhibited group (294.9 mIU.h/L, $p < 0.01$). Controls had intermediate responses (164.2 mIU.h/L) PRL response also correlated negatively with the Barratt total impulsivity score ($r = -0.27, p < 0.05$) and the SHAPS impulsivity ($r = -0.26, p < 0.05$) and aggression ($r = -0.28, p < 0.05$) scales.

The findings indicate reduced 5-HT functioning in impulsive aggressive PD patients but also suggest increased 5-HT functioning in inhibited or overcontrolled personalities.

IMPULSIVITY AND AGGRESSION IN PATIENTS WITH SELF-DESTRUCTIVE BEHAVIOR AND THEIR RELATION TO SEROTONERGIC DYSFUNCTION

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Problems of impulse control which are currently discussed in a variety of psychiatric disorders and dysfunctional behaviours have been associated with reduced central serotonergic activity. In this study, psychometric and biological measures of impulsivity and aggression were assessed within a population of female patients attending a treatment program for personality disorders. Three clinical groups of subjects were studied: self-mutilators, patients with repetitive impulsive poisoning and as a clinical control group personality disordered patients without any disorder of impulse control. A non-clinical sample of normal probands was recruited, as well. According to Lacey and Evan's concept of "multi-impulsive personality disorder" participants were rated for different modes of impulsive behaviors and were asked to complete a battery of self-assessment inventories including the Barratt-Impulsiveness-Scale, the State-Trait-Anger Expression Inventory, and the "Fünf-Aggressivitäts-Faktoren" (a German scale similar to the Buss-Durkey-Hostility-Inventory). The Hamilton Depression Rating Scale (HDRS) scores were recorded for all subjects. As a biological measure, the prolactin (PRL) response to D-fenfluramine, a quite specific 5-HT releaser and reuptake inhibitor, served as the index of central 5-HT activity.

Subjects with either mode of impulsive behavior scored high on the impulsivity, irritability, and anger temperament scale, however, low on anger control in comparison to patients without impulsive behaviors and to normal probands. They were not characterized by a tendency toward outwardly directed aggressive behavior. Self-mutilators did not differ from those subjects with self-poisoning except for severity of impulsive behaviors.

The D-Fenfluramine challenge test was performed in drug free subjects who were controlled for age, weight, season of study, and fluctuations throughout the menstrual cycle. The depressive state was assessed as a covariate which may have influence on PRL response. The analysis of covariance revealed lower mean responses in self-mutilators compared with the normal control group when the HDRS score was introduced as a covariate. Self-mutilators did not differ significantly from personality-disordered patients without impulsive behaviors. PRL response correlated negatively with the HDRS, the anger suppression, and the Barratt non-planning impulsivity scores but did not correlate with the severity score of impulsive behaviors.

Our findings indicate a relation between reduced 5 HT-functioning and both, depression and impulsivity, however, not with impulsive aggressive behavior.

PERSONALITY DISORDERS AMONG CRIMINAL OFFENDERS: AN ANALYSIS OF 1498 CONSECUTIVE FORENSIC PSYCHIATRIC INVESTIGATIONS

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A new Forensic Psychiatric Legislation was introduced in Sweden in 1992. Whereas personality disordered criminal offenders were previously to a great extent considered mentally insane, the new Law was intended to be more restrictive. Only those offenders suffering from a *severe mental disorder*, which was the new legal concept, were to be excluded from imprisonment, the aim of this study is to analyse to what extent and under which circumstances personality disordered offenders are judged to fulfill legal criteria for *severe mental disorder* in forensic psychiatric investigations performed since 1992. An additional aim is to investigate prevalence of personality disorders among mentally disordered criminal offenders in relation to functional level, psychosocial stressors and crime.

Out of all 1498 forensic psychiatric investigations of male offenders in Sweden during 1992 through 1994, 453 individuals received a personality disorder diagnosis as principal diagnosis, alone or in combination with a diagnosis of drug abuse or dependence. Among those with personality disorder diagnoses, 19% were judged to fulfill criteria for a *severe mental disorder* compared to 49% among all 1498 individuals investigated. The most prevalent personality diagnosis among the 453 males was Atypical personality disorder (45%), followed by Borderline (18%) and Antisocial (17%) personality disorder.

The presence of a concomitant drug abuse/dependence or psychosocial stressors prior to crime did not significantly affect the odds ratio for *severe mental disorder*. Despite being severely disordered in terms of low functional level and frequent concomitant drug abuse, offenders with Antisocial PD were most unlikely to be judged as fulfilling criteria for a *severe mental disorder*. From a logistic regression model it was concluded that the most important factors comprising a *severe mental disorder* were a cluster A diagnosis, low functional level according to DSM axis V and a non-violent crime.

THE IMPACT OF PERSONALITY DISORDERS FOR THE PROGNOSIS OF DELINQUENCY

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Prediction of future delinquency — or risk assessment — is required from the forensic psychiatrist, when previous delinquency was associated with some sort of psychopathology and when the offender is considered to be so dangerous that preventive detention may be required (if the law provides for such a detention). Two main diagnosis are regarded as being associated with delinquency and especially violent crimes: Schizophrenia and Personality disorders. More than 75% of all detained mental patients in Germany received one of the two diagnosis.

This paper deals with the risk assessment of individuals with personality disorders. Personality disorders are characterized by a psychopathology that is fairly stable over time and by the fact that treatment has very little influence on them. From these assumptions one would conclude that risk assessment is not too difficult with these individuals. On the other hand there are typical age related decreases of delinquency especially in dissocial personality disorders which are generally most prone to relapse into crime. So risk assessment

has not only to rely on a specific diagnosis but also and even more on the individual course of the disorder and of other factors that are associated with relapse.

In our study we have applied an assessment approach that takes both static and dynamic factors into consideration: The main factors are: (1) index crime (Base rate, connection with personality traits, situational factors), (2) personality before index crime, (3) personality changes after index crime, (4) future social environment. Several instruments have been used to assess the probands, most important the FPDS (Nedopil et al. 1988) and the PCL-R (Hare 1991). The assessment were made to decide upon release from high or medium security hospitals. The analysis is based on 72 assessments, 42 of those assessed suffered from a personality disorder. Previous mean length of stay in security hospitals and prognostic evaluation did not differ significantly between patients with personality disorders and schizophrenics. Changes of symptoms, attitudes and behaviors could also be observed in personality disordered patients. In accordance with the literature (Hart et al. 1988) a high score on the PCL-R was, however associated with an unfavorable prognosis.

S87. Functional magnetic resonance imaging

Chairmen: P Woodruff, M Spitzer

VERBAL WORKING MEMORY: AN fMRI ACTIVATION PARADIGM FOR INVESTIGATING SCHIZOPHRENIA

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Working memory deficits have been reported in schizophrenia and may be attributable to disrupted functional connections between prefrontal and temporoparietal cortex. The aim of the current study was to develop a working memory activation paradigm using fMRI to investigate brain function in schizophrenia. Using multislice, echoplanar fMRI we have contrasted regional brain activity during a control and an experimental condition which differed with respect to the demands placed on verbal working memory. Subjects were 7 right-handed healthy male volunteers. In the working memory condition, subjects viewed a pseudorandom series of letters and were asked to indicate when the current letter was the same as that presented two previously (eg: A-S-A). In the control condition, subjects were presented with letters appearing in alphabetical order and asked to respond when the letter X appeared out of sequence (eg: A-B-X). Analysis of group and individual data revealed activation in the anterior and posterior parasagittal cortex in all subjects, left temporoparietal cortex (6 subjects) and left dorsolateral prefrontal cortex (5 subjects). In agreement with previous brain activation studies, our results suggest that verbal working memory is subserved by a neurocognitive network comprising cortical regions involved in attention, executive function and short term mnemonic processes. This technique offers considerable potential for investigating the integrity of this neural network in schizophrenia. In particular, fMRI will allow longitudinal studies of the interaction between phenomenology, treatment and brain function.