An Algorithm for the Treatment of Schizophrenia in the Correctional Setting: The Forensic Algorithm Project

Charles A. Buscema, M.D.; Qamar A. Abbasi, M.D., Ph.D.; David J. Barry, M.S.; and Timothy H. Lauve, M.A.

The Forensic Algorithm Project (FAP) was born of the need for a holistic approach in the treatment of the inmate with schizophrenia. Schizophrenia was chosen as the first entity to be addressed by the algorithm because of its refractory nature and high rate of recidivism in the correctional setting. Schizophrenia is regarded as a spectrum disorder, with symptom clusters and behaviors ranging from positive to negative symptoms to neurocognitive dysfunction and affective instability. Furthermore, the clinical picture is clouded by Axis II symptomatology (particularly prominent in the inmate population), comorbid Axis I disorders, and organicity.

Four subgroups of schizophrenia were created to coincide with common clinical presentations in the forensic inpatient facility and also to parallel 4 tracks of intervention, consisting of pharmacologic management and programming recommendations. The algorithm begins with any antipsychotic medication and proceeds to atypical neuroleptic usage, augmentation with other psychotropic agents, and, finally, the use of clozapine as the common pathway for refractory schizophrenia. Outcome measurement of pharmacologic intervention is assessed every 6 weeks through the use of a 4-item subscale, specific for each forensic subgroup. A "floating threshold" of 40% symptom severity reduction on Positive and Negative Syndrome Scale and Brief Psychiatric Rating Scale items over a 6-week period is considered an indication for neuroleptic continuation. The forensic algorithm differs from other clinical practice guidelines in that specific programming in certain prison environments is stipulated. Finally, a social commentary on the importance of state-of-the-art psychiatric treatment for all members of society is woven into the clinical tapestry of this article.

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Reprint requests to: Charles A. Buscema, M.D., Box 300, River Rd., Marcy, NY 13403 (e-mail: cnmdcab@omh.state.ny.us).

We have entered an era of high-quality treatment for all members of society, whether it be professionals in private managed-care organizations or inmates who receive treatment in the public health sector. The seriously and persistently mentally ill population has moved into the prisons, where treatment often determines an inmate's condition at the time of release back into the community. The average length of incarceration for a convicted felon in New York State is 5½ years.[1] There are approximately 7700 inmates on the psychiatric rosters at any given time, and 3 times that number who refuse treatment. Thus, since deinstitutionalization changed the architecture of treatment 25 years ago, many thousands of inmates have been treated in the correctional setting and subsequently released back into the community. It has been well documented that recidivism rates for the seriously and persistently mentally ill population are quite high. In New York, an assisted outpatient treatment program was initiated in November 1999 (commonly known as Kendra's Law) to precisely track and treat these individuals following their release from prisons, prison hospitals, and civil facilities.[2]

The necessity for a high standard of psychiatric care, based on a common blueprint of treatment that would govern a holistic approach for the inmate-patient, seems paramount. Schizophrenia has long been regarded as one of the most refractory of all psychiatric disorders, and it is certainly one of the most challenging from the perspective of treatment in the prison setting. The logistics and standard of such treatment are presently being monitored at the Attica Correctional Facility by the federal court system as a result of the legislation known as Eng v. Goord (formerly Eng vs. Coughlin et al.).[3] Questions have arisen regarding the ability to provide humane and effective psychiatric treatment to schizophrenic inmates housed in the Attica Special Housing Unit (SHU), owing to the restrictions placed on psychiatric evaluation, pharmacologic intervention, and programming.[4,5]

Thus, in introducing what would appear to be the first forensic/correctional treatment algorithm, the focus became inmates diagnosed with schizophrenia and the methodology of such interventions, both in prison hospital (inpatient) and in prison-based satellite unit (outpatient) settings.[6,7]

Table 1. Characteristics of the Forensic Algorithm Project That Differentiate It From Clinical Practice Guidelines

Avoidance of medications associated with physiologic dependence
Potential pharmacoaugmentation after 6 weeks of monotherapy
Division into 4 forensic subgroups of schizophrenia
Rapid titration of psychotropic medications for control of agitated patients
Division of programming into 4 distinct "tracks," which mirror the 4 forensic subgroups
Recognition of comorbidity (eg, brain injury, posttraumatic stress disorder)
Inclusion of a noncompliance algorithm
Outcome management of data generated from forensic algorithm
First algorithm that accounts for prison environment as a variable in treatment

HISTORICAL PERSPECTIVE

There has been a great deal of recent effort devoted to establishing clinical practice guidelines for all psychiatric illnesses, among them schizophrenia. The most notable clinical practice guidelines have been authored by the American Psychiatric Association,[8] the Patient Outcomes Research Team,[9] the Expert Consensus Guidelines group,[10] and most recently, the Texas Medication Algorithm Project.[11] In January of 1999, the New York State Office of Mental Health (OMH) introduced its own clinical practice guidelines project in 11 pilot facilities across the state (M. Finnerty, M.D., M. McLaughlin, Ph.D., unpublished guidelines, 1999).

In working with OMH Practice Guidelines, it was evident that the huge differences between the civil and correctional populations would necessitate a radically different approach.

Table 1 illustrates the differences between clinical practice guidelines for the civil population and the forensic algorithm developed under the Forensic Algorithm Project (FAP).

CORRECTIONAL FACILITY SERVICES/ENVIRONMENT

The prison environment, from the vantage of the correctional/forensic algorithm, is divided into the general population, the residential crisis treatment programs (RCTPs), intermediate care programs (ICPs), SHUs, and the proposed ICP-SHU (Table 2 provides definitions and functional descriptions).

The SHU is the location in which inmates who are behaviorally disruptive are confined for disciplinary reasons. There are many theories regarding so-called "toxic SHU syndromes," but it is clear that seriously and persistently mentally ill inmates do not function well in the SHU environment and decompensate clinically, requiring transfer to an RCTP and eventually the inpatient hospital.[5]

The proposed ICP-SHU would be a unit for behaviorally disruptive inmates with confirmed psychiatric illness.

Table 2. Definition of Correctional Services and Programs

Service/Program	Definition
RCTP	Residential Crisis Treatment Programs have crisis beds in mental health units for individuals requiring crisis services; frequently used prior to hospitalization
ICP	Intermediate Care Programs are similar to day treatment centers but also provide segregated housing; units are staffed by both mental health and corrections staff
SHU	Special Housing Units are disciplinary cells used by corrections for behaviorally disruptive inmates; there is no programming, and inmates are in cells 23 hours per day, 7 days per week
ICP-SHU	A proposed unit for patients with persistent and/or severe Axis I disorders who also have disciplinary and behavioral problems; units will have a combination of ICP programming (4–6 hours/day) and SHU disciplinary restrictions

Programming would occur for 4 to 6 hours a day, and access to psychiatric services and pharmacologic intervention would reduce the need for inpatient hospitalization.

OMH CLINICAL PRACTICE GUIDELINES PROJECT ALGORITHM

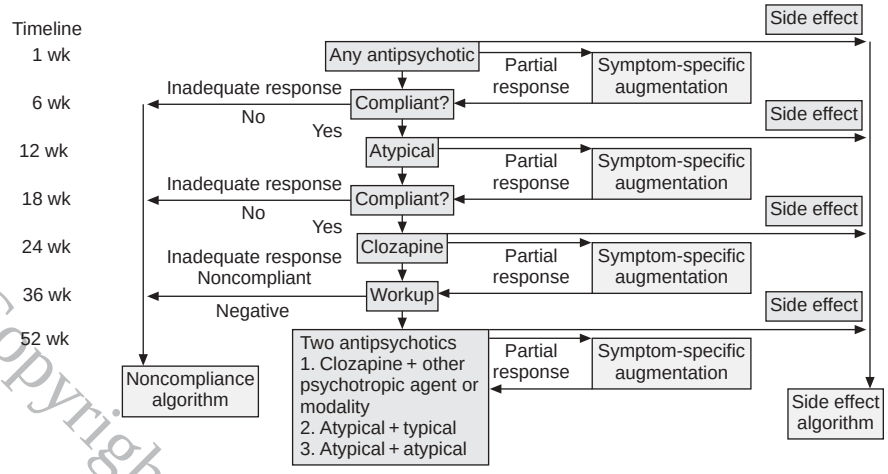
Figure 1 is a schematic of the original OMH Algorithm (Clinical Practice Guidelines Project), which was developed by several researchers including Molly Finnerty, M.D., and Mederick McLaughlin, Ph.D. (unpublished guidelines, 1999). The Brief Psychiatric Rating Scale (BPRS)[12] was selected as the principal instrument of outcome measurement. An automated prescribing summary (Figure 2) would give the clinician a 10-year perspective of the success or failure of pharmacologic interventions and would presumably govern neuroleptic decision making (M. Finnerty, M.D., M. McLaughlin, Ph.D., unpublished guidelines, 1999).

THE FORENSIC ALGORITHM

The FAP format establishes critical decision points in a longitudinal manner, beginning at 6 weeks and extending throughout the course of treatment for 1 year (Figure 1); reference 11 and M. Finnerty, M.D., M. McLaughlin, Ph.D., unpublished guidelines, 1999). Both pharmacologic and nonpharmacologic interventions would continue, based on the same FAP blueprint, in the outpatient satellite unit following discharge.

The patient is begun on any antipsychotic medication except clozapine on admission to the prison hospital on the basis of clinical presentation. Thus, the first neuroleptic may be a conventional or an atypical agent. At the time of admission, and once a week for the first 6 weeks of inpatient stay, a physician administers the BPRS.[12] The Global Assessment of Functioning (GAF)[13] is also administered at admission. BPRS scores are plotted on a graph for each

Figure 1. Overview of the New York State Office of Mental Health Algorithm[a]



[a]Adapted from M. Finnerty M.D., M. McLaughlin, Ph.D., unpublished guidelines, 1999.

Figure 2. Automated Prescribing Summary[a]

Medication	Ordering Physician	Dates of Medication		Duration of Medication			Minimum Dose[b]			Maximum Dose[c]		
		Start	Stop	< R	R	> R	< R	R	> R	< R	R	> R
Antipsychotics												
Mood Stabilizers												
Antidepressants												
Anxiolytics												

[a]Adapted from M. Finnerty, M.D., M. McLaughlin, Ph.D., unpublished guidelines, 1999. Abbreviation: R = recommended dose.
[b]A minimum dose given for fewer than 5 days is denoted "n/a."
[c]A maximum dose trial sustained for fewer than 6 weeks is denoted by "n/t."

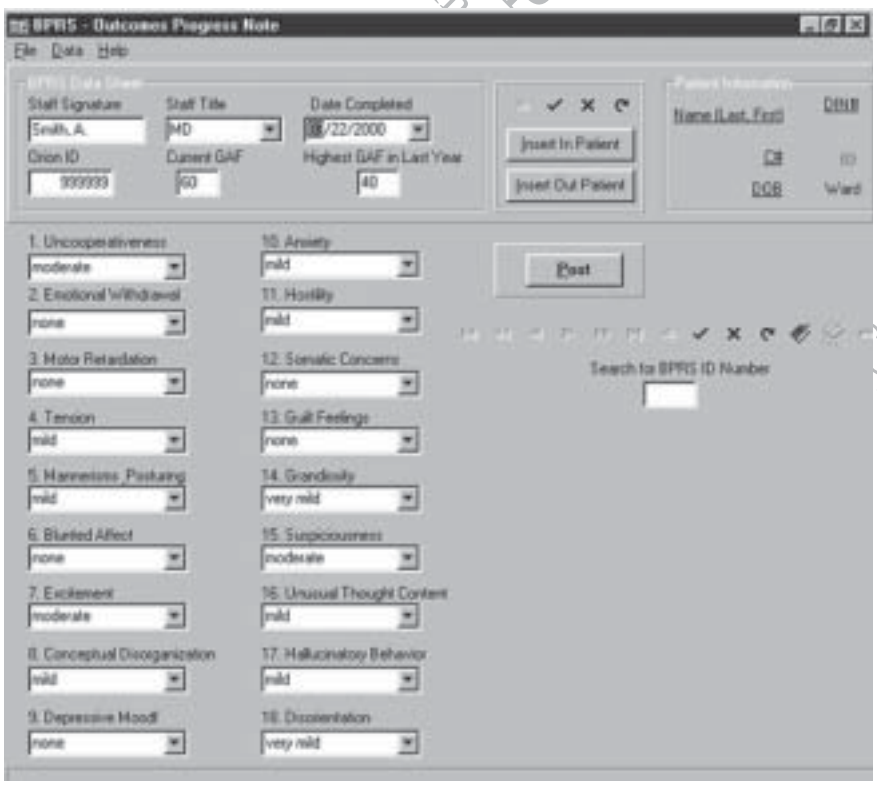
week; the threshold of improvement that would warrant continuation of the original neuroleptic medication is set at 40% of the admission BPRS score (Figure 3). There is substantiative evidence in the clinical literature for use of a 40% reduction in symptom severity as measured by BPRS scores as an acceptable threshold of improvement.[14] Most clinically based studies utilize reduction in symptom severity as a measure of positive clinical outcome. The BPRS is the most widely used instrument for determination of clinical improvement in schizophrenia.

The first critical decision point in the algorithm occurs at 6 weeks. At this time, the patient is administered the Positive and Negative Syndrome Scale (PANSS)[15–18] and assigned to 1 of 4 forensic subgroups on the basis of the highest score of the sum of the 4 items (BPRS or BPRS/PANSS) constituting each of the 4 forensic subgroups.

Figure 3. Brief Psychiatric Rating Scale: Example of an Improved Patient

A. Admission

B. 6 Weeks



The 4 forensic subgroups correspond to clinical presentations in the correctional environment: Forensic Type I, positive symptoms and hostility/aggressiveness; Forensic Type II, negative symptoms and neurocognitive dysfunction; Forensic Type III, affective instability associated with Forensic I or II; and Forensic Type IV, predominant Axis II pathology in conjunction with Forensic I, II, or III. These subgroups are described in more detail below. On the basis of subgroup assignment, the initial neuroleptic may also be augmented in a symptom-specific manner at this time. Subgroup scores are computed for the next 6-week period, and when the patient remains above the 40% threshold of symptom reduction established at 6 weeks (time of entry into subgroup), the second critical decision point is reached.

Critical decision point 2 of the algorithm stipulates the use of an atypical neuroleptic, regardless of the initial antipsychotic used. If the initial neuroleptic was an atypical, a different atypical neuroleptic must be utilized at week 12.

The third critical decision point occurs at week 18; if both of the first 2 neuroleptics were atypicals, the algorithm may be bypassed to the clozapine entry point, typically at 24 weeks. If not, the atypical neuroleptic may be augmented on the basis of symptom-specific parameters of the forensic subgroup.

Critical decision point 4 occurs at 24 weeks and is the entry point for all treatment-refractory patients. The PANSS is readministered to confirm the validity of the forensic subgroup, and a clozapine workup is performed if the patient fails to respond to all previous treatment efforts. Provided the patient is a good candidate, clozapine is begun and is titrated in the conventional manner.[19]

Critical decision point 5 occurs at 36 weeks; clozapine may be augmented with symptom-targeted psychotropic agents because of partial or inadequate response; clozapine levels should be rechecked and a workup for drug interactions performed.[20,21]

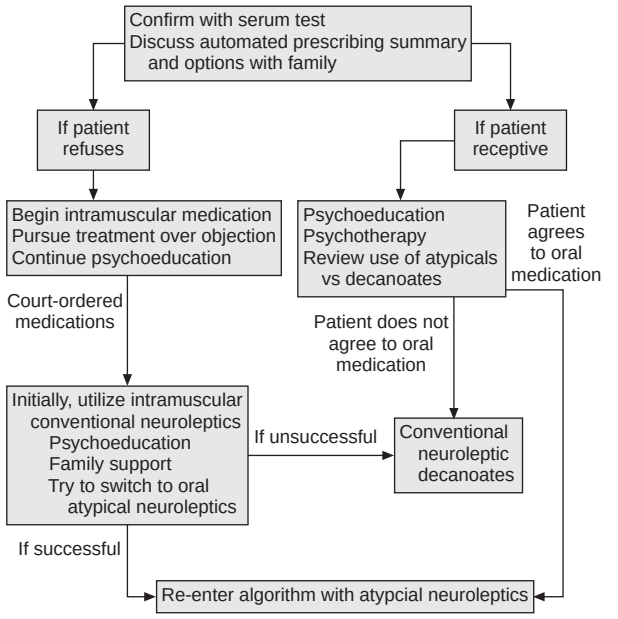
Critical decision point 6 of the algorithm occurs at 52 weeks and signifies clozapine failure. The patient is gradually tapered off clozapine treatment, and a variety of medical, neuroleptic, and neuropsychological tests are administered.[22–27]

NONCOMPLIANCE ALGORITHM

Noncompliance with psychotropic medication, particularly by a patient who lacks capacity to make reasoned decisions, may be encountered at any point in the continuum of treatment. As shown in Figure 4, a serum test will confirm noncompliance for purposes of medical-legal documentation.

At this point, the automated prescribing summary (see Figure 2) can be discussed in a rational and nonthreatening manner with the patient, preferably with a member of the patient's family present (M. Finnerty, M.D., M. McLaughlin, Ph.D., unpublished guidelines, 1999). The forensic division of the National Alliance for the Mentally Ill (NAMI) may also be contacted for their support of the family's efforts in behalf of treatment.

Figure 4. Management of Noncompliance



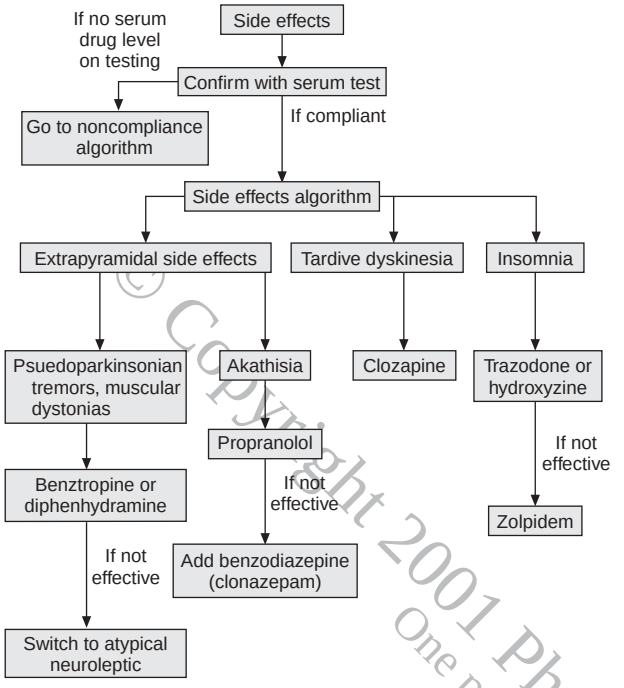
The options of oral atypical neuroleptics versus conventional intramuscular decanoate medications can be objectively presented to the patient. Decanoate formulations are often favored by inmates in correctional facilities because of the ease of administration.

If the patient refuses all neuroleptic agents, despite concerted efforts by the treatment team, family, and NAMI representatives, then the process of treatment-over-objection in the court system may be initiated. If the court hearing is successful and the patient receives intramuscular conventional neuroleptics (or chooses decanoate medications over oral agents), the treatment team focus should be to convert the patient to oral atypical neuroleptics and re-enter the treatment algorithm.

SIDE EFFECT ALGORITHM

The algorithm for conventional neuroleptic side effects (Figure 5) is introduced in the initial phases of treatment. A serum test will confirm compliance, for medical-legal documentation, and will also lend credence and validity to the patient's complaints regarding neuroleptic-induced side effects. If serum test results are negative for neuroleptics, then the noncompliance algorithm is indicated. Conventional neuroleptic side effects generally consist of extrapyramidal phenomena, including pseudoparkinsonian tremors, muscular dystonias, akinesia, and akathisia.[21] These side effects may be controlled with a combi-

Figure 5. Management of Side Effects



nation of benztropine, benzodiazepines, and propranolol. If side effects persist, a switch to an atypical neuroleptic is indicated. Tardive dyskinesia should be diagnosed in its earliest stages, and the conventional neuroleptic discontinued. Some studies suggest that a course of treatment with vitamin E (800–1600 IU per day) benefits approximately one third of all such patients.[28] Resumption of treatment should commence with clozapine.[29] Another ominous toxic effect of neuroleptics is neuroleptic malignant syndrome (NMS).[30] Mortality secondary to clozapine-induced NMS is very rare.[31]

FORENSIC SUBGROUPS

At the 6-week mark of the algorithm, treatment-refractory patients are administered another BPRS, the GAF, the Minnesota Multiphasic Personality Inventory-2 (MMPI-2), and the PANSS.[25] The BPRS is employed as an instrument to track clinical progress in the first 6 weeks of treatment. The PANSS is utilized to corroborate forensic subgroup assignment after 6 weeks and to validate these assignments should treatment failure occur. On the basis of the scores on these instruments, patients are assigned to 1 of 4 forensic subgroups. Patients with scores that overlap 2 subgroups, or whose scores are not congruous with their clinical presentation, may require specialized testing for confirmation of subgroup validity.[32] For example, the Personality Assessment Screener (PAS)[33]

Table 3. Forensic Type I: Positive Symptoms With Aggression[a]

Time	Clinical Intervention
On admission	Provide structured setting, psychoeducation, family and/or NAMI support
At 6 weeks	Transfer to continuing care; begin programming, eg, alternatives to violence, anger management; evaluate for comorbid disorders such as substance abuse, PTSD, head trauma
At 12 weeks	Provide psychoeducation regarding change in medications, supportive psychotherapy; continue structured environment
At 18 weeks	Provide psychoeducation regarding change in medication, psychiatric rehabilitation
At 24 weeks	Transfer to clozapine ward for psychoeducation and programming package
At 36 weeks	Provide psychoeducation regarding future treatment; evaluate for transfer to outpatient mental health unit
At 52 weeks	Review APS with family, provide psychoeducation regarding future treatment alternatives, evaluate for ECT and other unconventional treatment modalities

[a]Abbreviations: APS = automated prescribing summary, ECT = electroconvulsive therapy, NAMI = National Alliance for the Mentally Ill, PTSD = posttraumatic stress disorder.

has been divided into 10 clinical domains, including negative affect, social withdrawal, hostile control, acting out, anger control, and psychotic features. Neuropsychological testing with the Halstead-Reitan test[27] or Luria[34] involves a comprehensive battery of subtests that together reflect various areas of the brain and cognitive functioning. The MMPI-2[25] has a hypomania scale and the Millon Clinical Multiaxial Inventory-III (MCMI-III)[32] has a bipolar scale; both are useful in assessing affective instability. There are also specialized tests for assessing the degree of hostility and aggressiveness, such as the Overt Aggression Scale.[35]

Forensic Type I

Forensic Type I represents a hybrid of clinically relevant subscale items, drawn from the positive symptom and the hostility/aggressiveness subgroups. The 4 BPRS subscale items of Forensic I include uncooperative behavior, hostility, unusual thought content, and hallucinatory behavior. A Forensic I subgroup patient would typically present with command hallucinations, paranoid delusions, agitation, and aggressive behavior. The same design and methodology as employed in the first 6 weeks of BPRS testing applies to all of the forensic subgroup types. Therefore, if at 6 weeks a patient has a Forensic I subscale score of 28, the threshold would be set at 40%, or 17. The threshold is the degree of symptom severity reduction that must be obtained in 6 weeks of treatment. This decrement in overall symptom severity would constitute validation for continuation of the atypical neuroleptic currently utilized. Scores above the threshold would warrant augmentation or a change of neuroleptic.

Table 4. Forensic Type I: Treatment of Positive Symptoms With Hostility/Aggression, Weeks 6 to 24

Time	Pharmacologic Intervention
Week 1	Select any antipsychotic
Week 6	Utilize combination of conventional and atypical neuroleptics; augmentation with β-blocker, benzodiazepine, and/or mood stabilizer
Week 12	Select atypical antipsychotic
Week 18	Augment atypical neuroleptic with 2nd-choice neuroleptic, for example quetiapine and haloperidol
	Augment above with valproic acid, carbamazepine, lithium, or topiramate; β-blocker or clonidine; or clonazepam
	Involve patient in structured programming
	Utilize seclusion or wrist-to-belt restraints if necessary, particularly for self-injurious behavior
	Avoid 4- and 5-point restraints due to high prevalence of abuse in history (eg, posttraumatic stress disorder)
Week 24	Begin clozapine (refer to clozapine treatment protocol, Tables 16–20)

Table 3 illustrates the inpatient environmental and programming sequence, beginning with Forensic I subgroup assignment (positive symptoms with aggression) at week 6 and extending through a hypothetical continuum of 52 weeks. Table 4 illustrates the Forensic I algorithm, with the subgroup assignment at week 6 and subsequent augmentation of the neuroleptic in a symptom-specific manner. This augmentation may be implemented prior to 6 weeks if necessary. A conventional neuroleptic may be combined with an atypical (e.g., haloperidol with low-dose risperidone) or augmented by the addition of a β-blocker, a benzodiazepine (low doses for short time intervals have proved useful due to γ-aminobutyric acid [GABA]ergic effects), or an anticonvulsant such as divalproex sodium, carbamazepine, or topiramate.[36,37] At 12 weeks, assignment to an atypical neuroleptic is mandatory for nonresponders. At 18 weeks, treatment-refractory patients may again receive symptom-specific augmentation, for example, quetiapine may be combined with haloperidol, olanzapine with loxapine, or risperidone with thioridazine.[38–40] Unconventional agents for aggression such as clonazepam, clonidine, or naltrexone may be utilized.[41–44] If the patient becomes uncontrollably agitated and aggressive, seclusion followed by wrist-to-belt restraints (i.e., preventive aggression devices) should be utilized in lieu of 4- or 5-point restraints.[45] Trauma assessments on all of these patients should be obtained on admission, since postrestraint counseling has been demonstrated to reduce recidivistic aggression.[46,47] The clinical programming algorithm for the Forensic I subgroup in the prison environment (Table 5) includes a structured/low-stimulus setting (particularly for paranoid and aggressive individuals), psychoeducation, and family and/or NAMI support. Assessments for comorbid/dual disorders should include substance abuse (mentally ill chemical abusers), posttraumatic stress disorder (PTSD), developmental disabilities, and closed-head injuries (e.g., frontal lobe syndrome).[48,49]

Table 5. Clinical Programming for Forensic Type I: Positive Symptoms With Aggression[a]

Low-stimulus environment
House initially in RCTP for stabilization
Eventual transition to ICP or general population
Program tracks:
Anger management
Psychotherapy
MICA/dual recovery
Continued psychopharmacology

[a]Abbreviations: ICP = intermediate care program, MICA = mentally ill chemical abusers, RCTP = residential crisis treatment program.

Forensic Type II

Forensic Type II includes BPRS and PANSS items representing negative and neurocognitive symptoms, i.e., motor retardation, blunted affect, poor attention span, and difficulty with abstractive thinking. Clinically, the Forensic II subgroup patients present with apathy, poor grooming and hygiene, cognitive processing deficits, and latency of response to questions posed by the interviewer. These patients typically occupy intermediate care program beds in correctional facilities for years; they remain undetected and elude admission by withdrawal from other inmates and staff. The negative symptoms of schizophrenia are both primary (associated with illness) and secondary (due to depression, neuroleptic induction of parkinsonism such as akinesia, or long-term use of conventional neuroleptic agents).[50] Negative symptoms, unlike positive symptoms, tend to endure and persist between exacerbations of acute illness.[50] Negative symptoms have a functional location, that is, frontoparietal, suggesting a fundamental pathophysiologic distinction from positive symptoms.[50,51] The cognitive dysfunction that accompanies some forms of schizophrenia also appears to be a distinct entity, predating the onset of psychotic symptoms by several years.[50] Schizophrenics with negative symptoms and those with cognitive dysfunction made similar errors on the Cognitive Psychology On-line Laboratory (COGLAB) Card Sort Test, a computerized version of the Wisconsin Card Sort Test, errors that were perseverative in nature, indicating some form of frontal lobe dysfunction.[52] Negative symptomatology, frontal and soft neurologic signs, poor psychosocial performance, and cognitive impairment appear to be related phenomena in subgroups of schizophrenia.[51]

This algorithm begins with assignment to the Forensic II subgroup at week 6 and augmentation of the initial antipsychotic with a selective serotonin reuptake inhibitor (SSRI) (Table 6). Another less conventional strategy at week 6 would be the use of GABAergic compounds, such as benzodiazepines and valproate in combination with conventional neuroleptic agents; GABAergic compounds are associated with reduction in dopaminergic activity in the frontal lobes and may be useful in combating the "hypofrontality" seen in this subgroup of schizophrenia.[36]

Table 6. Forensic Type II: Pharmacologic Intervention for Negative Symptoms and Neurocognitive Dysfunction[a]

Time	Pharmacologic Intervention
Week 1	First-line antipsychotic
Week 6	Symptom-specific augmentation: conventional neuroleptics plus an SSRI or divalproex; atypical neuroleptics plus an SSRI
Week 12	Switch to atypical if currently using conventional neuroleptic; if already using an atypical, switch to 2nd-choice atypical
Week 18	Augmentation with 2nd-choice SSRI
	Augmentation with bupropion (avoid dextroamphetamines and methylphenidate)
	Consider clozapine or ECT
	Involve patient in structured programming
	Neurocognitive training
	Avoid 4- and 5-point restraints, utilize wrist-to-belt restraint for self-injurious behavior
	Psychiatric rehabilitation
Week 24	Clozapine (refer to clozapine treatment protocol, Tables 16–20)

[a]Abbreviations: ECT = electroconvulsive therapy, SSRI = selective serotonin reuptake inhibitor.

Table 7. Forensic Type II: Clinical Intervention for Negative Symptoms With Neurocognitive Dysfunction[a]

Time	Clinical Intervention
On admission	Provide psychoeducation, supportive psychotherapy, family and/or NAMI support
At 6 weeks	Transfer to continuing care; begin programming (eg, depression group), evaluate for comorbid disorders, eg, substance abuse, PTSD, head trauma
At 12 weeks	Provide psychoeducation, insight-oriented psychotherapies, cognitive-behavioral training
At 18 weeks	Provide psychoeducation, continue psychotherapies and patient education
At 24 weeks	Transfer to clozapine ward for psychoeducation and programming package
At 36 weeks	Provide neurocognitive retraining; evaluate for transfer to outpatient mental health unit
At 52 weeks	Review APS with family; provide psychoeducation regarding future treatment alternatives; evaluate for ECT and other unconventional treatment modalities

[a]Abbreviations are explained in the first footnote to Table 3.

Table 8. Clinical Programming for Forensic Type II: Negative Symptoms With Neurocognitive Dysfunction[a]

High-stimulus environment
ICP transition with goal to re-enter general population
Special needs unit if applicable
Program tracks
MICA/dual recovery
Depression group
Psychiatric rehabilitation
Cognitive retraining
Psychotherapy
Continued psychopharmacology

[a]Abbreviations are explained in the first footnote of Table 5.

Week 12 of the algorithm signals a change of neuroleptic to an atypical antipsychotic; the best choices for this subgroup would be olanzapine or risperidone.[53] Week 18 allows for augmentation of the atypical with a second-choice SSRI (other than that used at week 6). SSRI recommendations are fluoxetine and sertraline because of their intrinsic stimulatory properties. A second augmenting strategy at week 18 would be bupropion, which is a norepinephrine reuptake inhibitor and has a stimulatory property. Donepezil has also proved to be beneficial in cognitive dysfunction.[54] The clinical programming algorithm on an inpatient unit for Forensic II (Table 7) includes depression group at week 6 as well as evaluations for comorbid disorders such as substance abuse, developmental disabilities, learning disorders, closed-head injury (secondary to trauma), and PTSD (secondary to childhood and/or prison trauma).[55,56] A useful technique utilized by trauma counselors, applicable to an intellectually and cognitively impaired population, is eye movement desensitization reprocessing.[57] The clinical programming tracks for Forensic II in prison are delineated in Table 8.

Forensic Type III

Forensic Type III represents the domain of 2 subgroups, 1 for affective instability associated with Forensic I symptoms (i.e., hypomanic) and the second for affective instability associated with Forensic II symptoms (i.e., depressive). The 4 BPRS/PANSS items in the Forensic II/affective instability subscale (anxiety, depressed mood, poor attention, diminished abstractive capacity) and the 4 BPRS items in the Forensic I/affective instability subscale (hostility, grandiosity, unusual thought content, excitement) form Forensic III. Clinically, Forensic III patients present in 1 of 2 scenarios, i.e., 1 with grandiose delusions, psychomotor agitation, mood swings, and hostility; the second with depression, anxiety, neurocognitive dysfunction, and suicidal ideation. The above 2 subgroups represent the entities known as schizoaffective disorder, bipolar and depressed types.[58]

The pharmacologic algorithm for Forensic III is illustrated in Table 9. If the patient has a hypomanic presentation with marked mood swings, then augmentation would consist of valproic acid, topiramate, lithium, or carbamazepine.[38,59–61] Clonazepam is useful for hypomanic states as an adjunctive agent until stability is achieved.[38] If the patient has a depressed appearance with anxiety or panic, social withdrawal, and self-injurious behaviors, but not suicidal ideation, augmentation consists of an SSRI (sertraline or paroxetine are recommended owing to effects on panic disorder and social anxiety, respectively).[62,63] If suicidal ideation is present, electroconvulsive therapy (ECT) may be considered as an alternative to pharmacologic intervention.[64] Atypical antipsychotics of first choice for Forensic III are risperidone and olanzapine; risperidone is the preferred agent for the aggressive/hypomanic subgroups, and olanzapine is the preferred agent for the depressed or withdrawn clinical presentation.[65,66] If the initial antipsychotic was risperidone on admission and the

Table 9. Forensic Type III: Pharmacologic Intervention for Affective Instability Weeks 6 to 24[a]

Time	Pharmacologic Intervention
Week 1	First-line antipsychotic
Week 6	Symptom-specific augmentation
	If hypomanic or with marked mood swings, add valproic acid, carbamazepine, lithium, topiramate, or clonazepam
	If depressed without suicidal ideation, add SSRI to neuroleptic
	If depressed with suicidal ideation, evaluate for ECT with neuroleptic
Week 12	Switch to atypical if currently using conventional antipsychotic, switch to 2nd-choice atypical if using atypical
Week 18	Symptom-specific augmentation strategies
	If depressed, then olanzapine plus SSRI (2nd choice) or risperidone plus SSRI (2nd choice)
	If hypomanic with mood swings, then olanzapine plus lithium, valproic acid, or gabapentin or risperidone plus lithium, valproic acid, or gabapentin
Week 24	Clozapine (refer to clozapine treatment protocol, Tables 16–20)

[a]Abbreviations are explained in the first footnote to Table 6.

Table 10. Forensic Type III: Clinical Intervention for Affective Instability[a]

Time	Clinical Intervention
On admission	Provide structured setting, minimize stimulation, family and/or NAMI support
At 6 weeks	Transfer to continuing care; begin programming (eg, depression group therapy); evaluate for comorbid disorders, eg, substance abuse, PTSD, head trauma
At 12 weeks	Provide psychoeducation, insight-oriented psychotherapies, group therapy
At 18 weeks	Provide psychoeducation; continue psychotherapies, psychiatric rehabilitation, OT/RT
At 24 weeks	Transfer to clozapine ward for psychoeducation and programming package
At 36 weeks	Provide bipolar and depression group therapy; evaluate for transfer to outpatient mental health unit
At 52 weeks	Review APS with family; provide psychoeducation regarding future treatment alternatives; evaluate for ECT and other unconventional treatment modalities

[a]Abbreviations: OT = occupational therapy, RT = recreational therapy; other abbreviations are explained in the first footnote to Table 3.

Table 11. Clinical Programming for Forensic Type III: Affective Instability[a]

Low-stimulus environment
House initially in RCTP for stabilization
Eventual transition to ICP or general population
Program tracks
Anger management
Depression/bipolar group therapy
MICA/dual recovery
Continued psychopharmacology

[a]Abbreviations are explained in the first footnote to Table 5.

patient remains agitated, the second-choice atypical drug at week 12 should be quetiapine or olanzapine because of their beneficial effects on agitation and aggression.[67] The atypical antipsychotics are both dopamine and serotonin antagonists, in varying proportions, and have therapeutic clinical effects on psychosis, aggression, negative symptomatology, neurocognitive dysfunction, and affective instability.[68] None of the atypical neuroleptics, with the exception of clozapine, has full schizophrenia-spectrum disorder symptom alleviation, which accounts for neuroleptic combinations and psychotropic-neuroleptic combinations recommended prior to week 24.[69] Critical decision point 3 (week 18) requires augmentation of the atypicals with a second-choice SSRI (other than the one utilized at week 6) for depressed presentation and augmentation with mood-stabilizing agents for the hypomanic presentation. Gabapentin seems to possess mood-stabilizing properties in affective instability; divalproex and topiramate are other choices.[70–72] Table 10 delineates the clinical programming algorithm for Forensic III. Assessment for trauma, organicity, and substance abuse should have been accomplished by week 6. PTSD will exacerbate any underlying symptomatology in the schizophrenic spectrum; sertraline has recently been approved by the U.S. Food and Drug Administration for treatment of PTSD.[73,74] The presence of organicity on Mini-Mental State Examination or on more elaborate neuropsychological testing should be addressed through the use of atypical neuroleptics, mood-stabilizing agents, SSRIs (also beneficial for autism and pervasive developmental disorder), and the avoidance of benzodiazepines and addicting psychostimulants such as methylphenidate.[75–79] Table 11 addresses outpatient clinical programming and pharmacologic intervention.

Forensic Type IV

Forensic Type IV is the most complex of all subgroups with respect to overall management owing to the predominant underlying Axis II disorder. There must be accurate subgroup placement in Forensic I, II, or III, along with recognition of elevated scores on the MMPI-2, PAS, and/or MCMI-III.[25,32,33] Table 12 illustrates the treatment algorithm through week 24. Pharmacotherapy of the Forensic IV subgroup is based upon the same treatment rendered to the other 3 subgroups; in addition, atypical neuroleptics have proven efficacy in Cluster B types, such as borderline personality disorders. Assignment of borderline personality patients to a dialectic behavioral therapy ward after alleviation of Axis I symptoms is the recommended therapeutic progression.[80,81] Seclusion and short-term wrist-to-belt restraints (variation of preventive aggression devices) are preferable to 4- or 5-point restraints in the event of aggression or self-injurious behaviors.[45] Table 13 delineates the inpatient clinical programming tracks for Forensic IV and is consistent with the preceding description of specialized therapies. Table 14 illustrates programming tracks for Forensic IV in prison for inmate-

Table 12. Forensic Type IV: Pharmacologic Intervention for Prominent Axis II Disorder, Weeks 6 to 24[a]

Time	Pharmacologic Intervention
Week 6	Assign to Forensic I, II, or III based on prevalent symptoms and treat according to subgroup-specific pharmacologic algorithm Administer PANSS and other personality inventories Assign to behavioral unit with dialectic behavior therapy Wrist-to-belt restraints on short-term basis for self-abuse and/or aggression Structured programming
Week 24	Clozapine (refer to clozapine treatment protocol, Tables 16–20)

[a]Abbreviation: PANSS = Positive and Negative Syndrome Scale.

Table 13. Forensic Type IV: Clinical Intervention for Personality Disorder[a]

Time	Clinical Intervention
On admission	Provide highly structured, consistent setting, psychoeducation, family and/or NAMI support
At 6 weeks	Transfer to dialectic behavior therapy ward; provide programming on ward; evaluate for comorbid disorders, eg, substance abuse, PTSD, head trauma
At 12 weeks	Provide psychoeducation, dual therapy for MICA; encourage participation in Alcoholics Anonymous and Narcotics Anonymous; utilize restraints and/or seclusion if necessary to prevent self-injurious behaviors
At 18 weeks	Provide psychoeducation, continue psychotherapies, dual therapy for MICA, dialectic behavior therapy
At 24 weeks	Transfer to clozapine ward for psychoeducation and programming package
At 36 weeks	Administer drug screens and check serum levels; continue substance abuse groups and behavioral program; evaluate for transfer to outpatient mental health unit
At 52 weeks	Review APS with family; provide psychoeducation regarding future treatment alternatives; evaluate for ECT and other unconventional treatment modalities; evaluate for transfer to borderline treatment units at correctional facilities

[a]Abbreviation: MICA = mentally ill chemical abusers. Other abbreviations are explained in the first footnote to Table 3.

Table 14. Clinical Programming for Forensic Type IV: Personality Disorders, Not in Special Housing Unit[a]

Neutral stimulus environment
Return to originating correctional facility or mental health service
Program tracks
Anger management
MICA/dual recovery
For antisocial personality disorder, behavior modification program
For borderline personality disorder, dialectic behavior therapy
Continued psychopharmacology

[a]Abbreviation: MICA = mentally ill chemical abusers.

patients who are not subject to disciplinary placement in SHUs (see Table 2) upon their return.

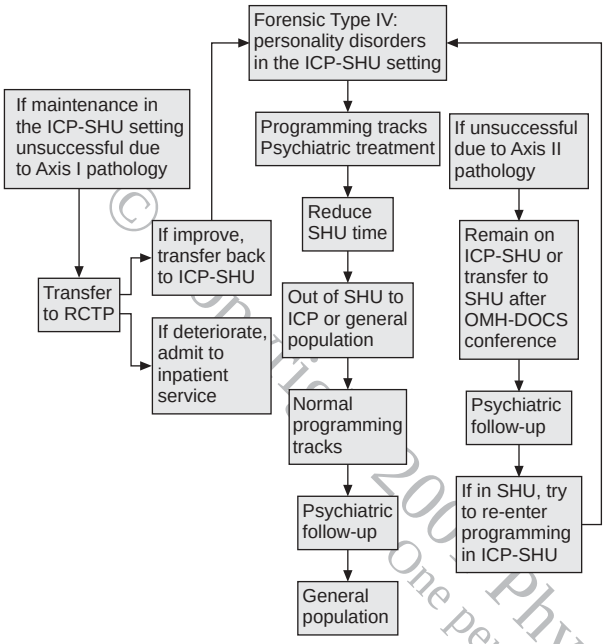
The more complex situation is encountered with the inmate-patient returning to an SHU (Figure 6). A proposal for treatment of this patient comprises admission to an RCTP on return from the inpatient hospital (see Figure 6; Table 15). The patient would be transferred from the RCTP to a hypothetical ICP-SHU (see Table 2) upon clinical improvement; if no clinical improvement occurs, the patient would be returned to the hospital. The ICP-SHU proposal advances the design of an intermediate environment with 4 to 6 hours of programming per day, i.e., a disciplinary structure with increased psychiatric programming.

CLOZAPINE ALGORITHM

Clozapine is the choice neuroleptic after 18 to 24 weeks of treatment with conventional and atypical antipsychotics, in some instances augmented by other psychotropic medications.[82,83] Clozapine has been positioned in the algorithm to be the medication utilized after failure of both a conventional neuroleptic and an atypical neuroleptic, or 2 atypical neuroleptic failures. There is limited justification for the use of clozapine as an initial neuroleptic in the early stages of the algorithm owing to its potential for life-threatening side effects. Clozapine has confirmed efficacy in refractory symptomatology, such as aggression, neurocognitive dysfunction, affective instability with associated self-injurious behaviors, and suicide, and even in borderline personality disorders with aggressive behaviors.[84–86] It is also effective in the phenomenon of compulsive water-drinking.[87] Clozapine has relatively high dopamine-1 (D_1), low D_2, and high serotonin-1 and -2 (5-HT_1 and 5-HT_2) receptor affinity, accounting for the lack of extrapyramidal effects and the antiaggressive effect.[29,88,89] The primary metabolism of clozapine is controlled by cytochrome P450 1A2 (CYP1A2), which is influenced by a number of psychotropic agents, notably the SSRIs fluoxetine and fluvoxamine; fluvoxamine can increase the serum level of clozapine 10-fold in a period of 7 to 14 days.[90] The events at 24 weeks include tapering the patient off all other psychotropic agents and performing a clozapine workup, which is both medical and psychiatric in nature. Psychiatric workup includes the PANSS for confirmation of subgroup assignment, an assessment of compliance due to the necessity for weekly serum levels (clozapine levels and complete blood count with differential), and psychoeducation in the form of an orientation to the benefits of clozapine (Table 16).

Side effects secondary to clozapine administration are divided into minor versus serious (toxic effects) and fall along a continuum of common to rare events. The clozapine side effects algorithm includes tachycardia, orthostatic hypotension with associated dizziness, weight gain, constipation, and minor extrapyramidal symptoms.[29] The respective remedies for these side effects are delineated in Figure 7. Seizures can usually be controlled with phenytoin, but poor control with 1 or more anticonvulsants may

Figure 6. Clinical Programming for Forensic Type IV: Personality Disorders in Proposed Intermediate Care Program–Special Housing Unit (ICP-SHU) Setting[a]



[a]Abbreviations: OMH-DOCS = Office of Mental Health-Department of Corrections, RCTP = residential crisis treatment program.

Table 15. Clinical Programming for Forensic Type IV: Personality Disorders, Special Housing Unit (SHU)[a]

Axis I pathology interfering with adjustment
Transfer to RCTP
If improves, then transfer to ICP-SHU and re-enter programming
If patient clinically deteriorates then transfer to CNYPC
Axis II pathology interfering with adjustment
Remain on ICP-SHU with programming or transfer to SHU after OMH-DOCS conference
Psychiatric follow-up
Evaluate for transfer to ICP-SHU
Programming and treatment successful
Evaluate to reduce SHU time
Transfer to least restrictive treatment setting
Psychiatric follow-up

[a]Abbreviations: CNYPC = Central New York Psychiatric Center (prison hospital), OMH-DOCS = Office of Mental Health-Department of Corrections; other abbreviations are explained in the first footnote to Table 5.

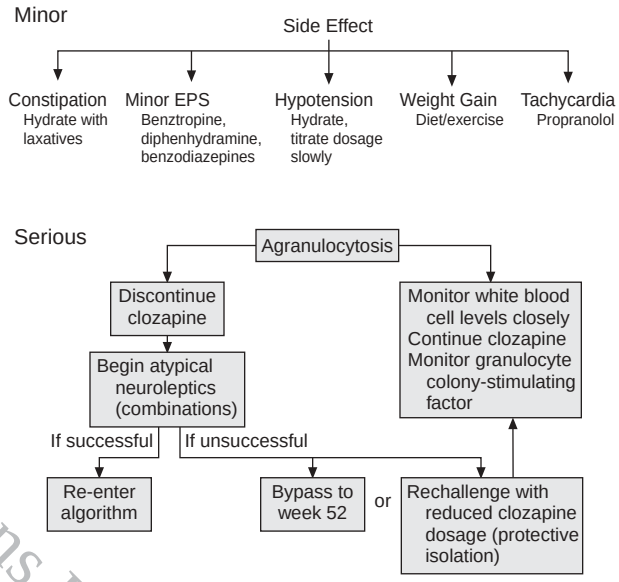
dictate clozapine discontinuation (phenytoin may also decrease serum clozapine levels by 50%).[91] Figure 8 also illustrates the serious, life-threatening toxic side effect known as agranulocytosis.[92] This should always be suspected with sore throat, fever, candidiasis, a white blood cell count below 3000/mm^3, and a granulocyte count in the 1000 to 1500/mm^3 range.[92] The clinician has 2 options in the event of agranulocytosis: (1) continue clozapine at a reduced dosage, monitor the complete blood and granulocyte count closely in protective isolation, and utilize

Table 16. Clozapine Stage: 24 Weeks[a]

Clozapine medical workup
Administer PANSS and reassign if necessary to correct forensic subgroup assignment
Taper all other psychotropic medications and begin titration with clozapine on recommended schedule
Weekly complete blood count and subscale testing

[a]Abbreviation: PANSS = Positive and Negative Syndrome Scale.

Figure 7. Clozapine Side Effects and Toxicity[a]



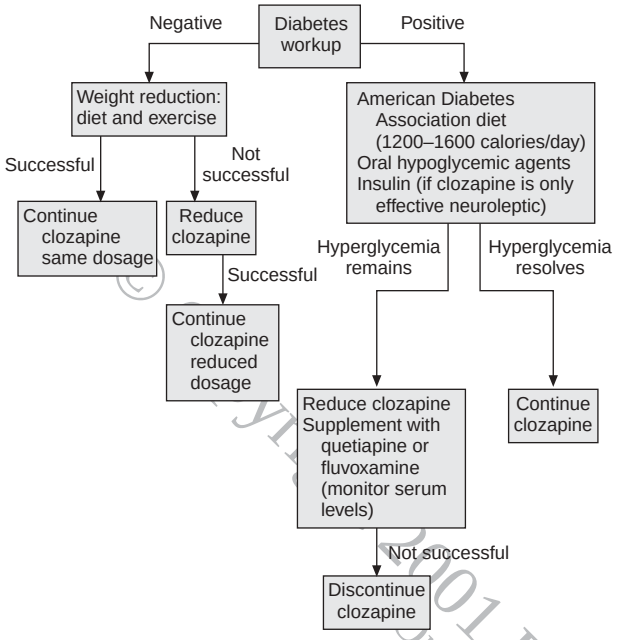
[a]Abbreviation: EPS = extrapyramidal symptoms.

granulocyte colony-stimulating factor; (2) discontinue the clozapine, begin another atypical neuroleptic, and track the subscale scores and clinical condition of the patient.[92]

Figure 8 illustrates the toxic side effect of hyperglycemia, encountered in treatment with clozapine and its related neuroleptic, olanzapine. Both clozapine and olanzapine induce hyperglycemia, which may be because of weight gain.[93–95] Clozapine dosage, as has been suggested in recent literature, can be decreased and an augmentation dosage of quetiapine begun (i.e., 50–200 mg/day) with the same therapeutic efficacy and a decreased side effect profile.[96] Another strategy is the use of the SSRI fluvoxamine, which competes with clozapine/norclozapine metabolism at the CYP1A2 site, increasing serum levels of clozapine exponentially.[90] A relatively small daily dosage of clozapine can, therefore, be used, and a reduced side effect profile obtained. Other side effects associated with clozapine treatment include sialorrhea, NMS (discontinue clozapine), cardiac arrhythmias (treat medically), and anticholinergic toxicity (treat supportively).[29]

Clozapine must be initiated in a treatment setting where medical supervision is available. There is a specific practice guideline[19] for the initiation of clozapine by which the

Figure 8. Clozapine Side Effects: Hyperglycemia



oral dosage of 350 to 400 mg/day may be achieved by the second week of treatment. The usual therapeutic dosage is 300 to 700 mg/day with a maximum of 900 mg/day (in divided doses).

Serum clozapine levels should be obtained 12 hours after last administration, and the recommended therapeutic window is 250 to 350 ng/mL. The "threshold" is 350 to 420 ng/mL, above which linear (dose-related) side effects and toxicity increase dramatically.[19,97]

The partial or inadequate response to clozapine is addressed in Table 17; partial therapeutic response due to drug interactions is addressed in Tables 18 and 19. At week 36, clozapine may be augmented with a conventional neuroleptic (e.g., haloperidol, 5–10 mg/day) or an atypical neuroleptic (e.g., risperidone, 1–3 mg/day) for Forensic I (positive symptoms and aggression) and Forensic II (negative symptoms and neurocognitive dysfunction), respectively.[98,99] Forensic III (bipolar/hypomanic type) may have clozapine augmented with anticonvulsants or lithium (although lithium and clozapine may predispose the patient to NMS)[87,100–103]; Forensic III (depressed type) may have augmentation with ECT if suicidal and with SSRIs if not suicidal (avoid fluoxetine and fluvoxamine).[64,90,104] Combinations of clozapine and carbamazepine should be avoided because of immunosuppressive potential.[105] Since clozapine is highly anticholinergic, crisis due to combinations with drugs with such potential may lead to narrow-angle glaucoma and paralytic ileus.[29] Phenytoin induces the cytochrome P450 system and may decrease clozapine levels by 65% to 85%.[106] Clozapine and other epileptogenic agents, such as bupropion and maprotiline, should be avoided. Clozapine and benzodiazepines (particularly lorazepam) may cause excessive sedation and sialorrhea.[29] Clozapine and certain SSRIs may result in dramatically increased serum clozapine levels.[90]

Table 17. Partial Response to Clozapine: Drug Augmentation at Week 36[a]

Forensic Type	Treatment
I	Clozapine and conventional neuroleptic (eg, haloperidol)
II	Clozapine and atypical neuroleptic (eg, risperidone)
III	Hypomanic: Clozapine plus divalproex or lithium Depressed: Clozapine plus ECT (if suicidal); Clozapine plus SSRIs (if not suicidal)
IV	Utilize Forensic Type I, II, or III as applicable to clinical presentation

[a]Abbreviations are explained in the first footnote to Table 6.

Table 18. Clozapine Augmentation: Drug-Drug Interactions, Weeks 36 to 52

Avoid combination of carbamazepine plus clozapine
Watch for anticholinergic crisis with combinations of atypicals, conventionals, psychostimulants
Phenytoin plus clozapine may reduce steady-state clozapine levels by 65% to 85%
Clozapine plus benzodiazepines, especially lorazepam, may cause sedation and sialorrhea
Carefully monitor the following medications in combination with clozapine:
- Fluvoxamine
- Pemoline
- Methylphenidate
- Carbamazepine
- Bupropion
- Thioridazine
- Lorazepam
- Phenytoin

Table 19. Inadequate Response to Clozapine at 52 Weeks

Check length of trial, should be at least 3 to 6 months
Check plasma level (therapeutic range, 250–350 ng/mL)
Evaluate compliance
Check drug-drug interactions (cytochrome P450 [CYP] system enzyme inhibition, enzyme CYP1A2 involved in clozapine-fluvoxamine inhibition)
Confirm principal diagnosis
Perform neuropsychiatric evaluation

Clozapine Failure at 52 Weeks

Table 20 illustrates clozapine failure after 52 weeks of treatment. At this point the following should be accomplished:

- Clozapine should be gradually decreased over a 1- to 2-week period of time.
- A complete battery of psychological testing may be considered, including the PANSS, the Psycho-

pathology Checklist-Revised (Violence Risk Appraisal Guide assessment), the Mini-Mental State Examination, and the MMPI-2 and MCMI-III for purposes of reevaluating core psychopathology as well as comorbid conditions and Axis II psychopathology.[15,25,32,107]

- Medical workup should include basic laboratory testing of blood and urine, a heavy metal screen, a chest x-ray, and an electrocardiogram (ECG).
- Neurologic workup should include examination, electroencephalogram, computed tomography scan, and magnetic resonance imaging of the brain.
- Neuropsychological testing may include the Wisconsin Card Sort Test and other tests to rule out previously undetected organicity.
- Serum/urine screen and a substance abuse evaluation should be conducted to detect drugs of abuse.
- A trial of naltrexone (50–100 mg/day) may be helpful in distinguishing substance abuse.[108]

With completion of the postclozapine workup, the following unconventional trials may be considered for this most refractory group of diagnosed schizophrenic patients:

- Combinations of 2 atypical neuroleptics, such as risperidone, quetiapine, and olanzapine
- Combinations of atypical neuroleptics with pimozide; monitor ECG weekly for arrhythmias and conduction abnormalities[109,110]
- Two atypical neuroleptics, such as risperidone and olanzapine, and augmentation with lithium, an SSRI, divalproex, or ECT
- One or 2 atypical neuroleptics, in combination with a tricyclic antidepressant such as desipramine or a monoamine oxidase inhibitor such as phenelzine.

THE AUTOMATED PRESCRIBING SUMMARY AND RECOMMENDED DOSAGE RANGES FOR PSYCHOTROPIC MEDICATIONS

The Automated Prescribing Summary (see Figure 2) was developed to give the clinician an overview of the patient's 10-year treatment history (M. Finnerty, M.D., M. McLaughlin, Ph.D., unpublished guidelines, 1999). Included in the chart are the facility and prescribing physician names; active psychotropic medications with start and stop dates; duration of the medication in months; categorization of dosage as within, greater than, or less than the recommended range; indication whether minimum dose was sustained for more than 5 days; and indication whether maximum dose trial was sustained for more than 6 weeks.

Because it is important to maintain the patient at or near maximum recommended dosage for a sustained period of time, it may be necessary to rapidly titrate certain primary psychotropic medications while targeting specific symptom reduction. Recent research suggests that patients tolerate divalproex with rapid loading techniques, as well as with slow dosage titration.[111] While one may argue against this approach from the standpoint of receptor-site saturation (first-time psychotic episodes may only require 65% D_2 receptor saturation with haloperidol), it is an accepted fact in forensic facilities that psychiatrists are prescribing to manage Axis I symptomatology and control aggressive or self-injurious behaviors.[112]

Tables 21 and 22 detail the psychotropic medication(s) utilized in this algorithm with suggested dosage ranges for utilization both as an agent in monotherapy and as an adjunctive agent.

Table 20. Clozapine Failure at 52 Weeks[a]

Taper off clozapine gradually
Administer PANSS, Mini-Mental State Examination, VRAG, personality inventories
Complete medical workup with laboratory testing (especially metabolic factors)
Neurologic examination and neurologic testing
Blood urine for drug screen
Substance abuse workup/trial of naltrexone
Consider ECT and lithium workups
Two atypical antipsychotics
Two atypicals and ECT, lithium, SSRI, or haloperidol
Atypical antipsychotic and pimozide and/or fluvoxamine
NIMH experimental antipsychotic outcome studies

[a]Abbreviations: ECT = electroconvulsive therapy, NIMH = National Institute of Mental Health, PANSS = Positive and Negative Syndrome Scale, SSRI = selective serotonin reuptake inhibitor, VRAG = Violence Risk Appraisal Guide.

PROJECT IMPLEMENTATION AND OUTCOME MEASURES

Evidence-based practice guidelines provide recommendations based on a synthesis of the scientific literature concerning treatment for certain disorders, in this instance, schizophrenia.[113] There are both clinical and administrative reasons to believe that implementing such algorithms in mental health systems will be useful in improving outcomes, containing costs, predicting costs with greater accuracy, and utilizing resources in a more efficacious manner.[114–116]

The implementation of such medication algorithms will involve key strategies and principles germane to all such projects[114]: (1) stakeholder involvement throughout development and implementation (for example, the Office of Mental Health and Department of Corrections); (2) provision of education and technical assistance to clinicians, patients, and families (such as BPRS, PANSS, and GAF training, psychoeducation, and NAMI involvement); and (3) administrative support and modification of system structure (i.e., creation of ICP-SHU intensive treatment units as an alternative to disciplinary housing for the seriously and persistently mentally ill population).

Table 21. Dosage Ranges of Monotherapy[a]

Drug	Dosage Range (mg/d)
Antipsychotics	
Haloperidol	10–40
Haloperidol decanoate	150–400 mg q 4 wk
Fluphenazine	10–40
Fluphenazine decanoate	25–75 mg q 4 wk
Pimozide	1–4
Loxapine	50–200
Perphenazine	16–64
Thioridazine	300–800
Risperidone	2–8
Olanzapine	10–20
Quetiapine	300–800
Clozapine	300–700
Antidepressants	
Fluoxetine	20–60
Sertraline	50–200
Paroxetine	20–50
Fluvoxamine	150–300
Mirtazapine	15–45
Venlafaxine	150–300
Bupropion	150–400
Nefazodone	250–500
Desipramine	50–150
Phenelzine	15–60
Trazodone	300–600
Mood stabilizers	
Divalproex	1000–3000 (20–30 mg/kg/d)
Gabapentin	900–3600
Topiramate	50–200
Lamotrigine	250–500
Clonazepam	2–6
Lithium	1200–2400
Antiparkinsonians	
Benztropine	1–4
Propranolol	20–60
Sedative-hypnotics	
Hydroxyzine	100–200
Zolpidem	5–10

[a]From the Expert Consensus Guidelines.[10]

Table 22. Dosage Ranges of Adjunctive Medications[a]

Drug	Dosage Range (mg/d)
Antipsychotics	
Haloperidol	5–10
Haloperidol decanoate	75–150 mg q 4 wk
Pimozide	0.5–2
Fluphenazine	5–10
Fluphenazine decanoate	12.5–37.5 mg q 4 wk
Thioridazine	100–400
Loxapine	25–100
Perphenazine	4–16
Risperidone	1–3
Quetiapine	100–250
Olanzapine	5–10
Antidepressants	
Fluoxetine	10–30
Sertraline	25–100
Paroxetine	10–30
Fluvoxamine	50–100
Venlafaxine	75–150
Mirtazapine	15–30
Nefazodone	100–250
Bupropion	100–150
Desipramine	50–150
Trazodone	150–300
Mood stabilizers	
Divalproex	750–1500
Gabapentin	600–1800
Lamotrigine	150–250
Topiramate	25–100
Lithium	900–1500
Clonazepam	1–3
Antiparkinsonians	
Benztropine	1–2
Propranolol	20–40
Sedative-hypnotics	
Hydroxyzine	50–100
Zolpidem	5

[a]From the Expert Consensus Guidelines.[10] Multiple medications in the same class.

The implementation of this forensic algorithm project will be accomplished in the following manner.

Phase I

1. Prior to the introduction of medication algorithms, physicians in the inpatient and outpatient sector will conduct patient interviews and perform assessments with the BPRS and GAF. The population of patients will include all patients with a DSM-IV diagnosis of schizophrenia, schizoaffective disorder, and psychotic disorder NOS. In the outpatient setting, these patients will be assessed on admission to and discharge from the inpatient hospital and monthly for 6 months. Inpatients will be assessed at the time of admission, weekly for 6 weeks, at the time of treatment planning, and weekly for the 6 weeks prior to discharge. Automated prescribing summaries will be available to the physicians (see Figure 2). Assessment data will be initially in paper form and eventually Web based for computerized analysis (see Figure 3). Physicians will not be influenced by the structure provided by practice guidelines and treatment algorithms. The data collected from this prealgorithm project phase will serve as control/baseline outcomes.
2. Outcome measurements for this phase of the project will be divided into clinical instruments and other parameters of patient functioning. The clinical instruments utilized, i.e., the BPRS and GAF, have demonstrated reliability and validity for schizophrenia. The other parameters measured will include restraints/seclusion (data collected through Security Information Management Systems), recidivism rates, length of stay, incidents, and patient quality of life.[117–119] The Quality of Life Inventory[120] will be modified for the correctional environment so that a survey instrument will provide data, regarding adaptability to prison, as a direct result of psychiatric treatment. Outcome assessments should use representative samples and

appropriate scientific design, and outcomes should be reassessed at clinically meaningful points in time.[121]

Phase II

1. The FAP infrastructure will be applied to the same correctional population. A BPRS will be administered to the patient by the physician at the time of admission and once weekly for the first 6 weeks of hospitalization. If there is at least 40% reduction in symptom severity with the initial antipsychotic, then a PANSS need not be administered. The chief psychologist will administer the BPRS and PANSS at 6 weeks in the absence of 40% reduction, and based on resulting scores, subgroup assignment will occur.

   Data from the BPRS, PANSS, subscale instruments, and GAF will be paper based initially and eventually Web based for computerized analysis. While the BPRS, PANSS, and GAF all have demonstrated validity and reliability, this will be an important determination with respect to items in the forensic subscale instruments. These forensic subscale items must accurately represent the clinical entities undergoing treatment, and interrater reliability must also be established. Lack of either reliability or validity may cause amendment of forensic subscale items.
2. The same outcome assessment tools and measurements will be used, following use of the forensic algorithm, as were employed in Phase I. Comparisons will be made between restraints/seclusion rates, incidents, lengths of stay, recidivism rates, and quality-of-life measurements for the population treated in Phase I and in Phase II of this project. Our research hypothesis is that the FAP, consisting of all of the aforementioned tools and methodology, will lead to significant reduction in patient symptoms and improvement in patient functioning in a comparison with prealgorithm treatment efforts.

SUMMARY

This forensic/correctional algorithm was designed as an instrument through which a total care package for the schizophrenic inmate could be delivered, via a number of prescriptive critical decision points along a continuum of treatment. Schizophrenia was viewed not only as a form of psychotic disorder but also as a heterogeneous entity with various clinical presentations. Changes in the primary neuroleptic, augmentation with other psychotropic medications, the introduction of clozapine as the common pathway for refractory individuals, and the programming choices matched to clinical symptomatology and subtype were all depicted along the path of this algorithm.[122] The algorithm permits movement of the inmate-patient from the inpatient hospital to the outpatient correctional environment based on the 4 proposed forensic subtypes and the 4 corresponding treatment tracks. The purpose of this intricate FAP is the provision of state-of-the-art psychiatric services to the incarcerated seriously and persistently mentally ill population. Its validity and effectiveness have yet to be demonstrated.

Drug names: benztropine (Cogentin and others), bupropion (Wellbutrin), carbamazepine (Tegretol and others), clonazepam (Klonopin and others), clonidine (Catapres and others), clozapine (Clozaril and others), desipramine (Norpramin and others), diphenhydramine (Benadryl and others), divalproex sodium (Depakote), donepezil (Aricept), fluoxetine (Prozac), fluvoxamine (Luvox), gabapentin (Neurontin), haloperidol (Haldol and others), hydroxyzine (Atarax and others), lamotrigine (Lamictal), lorazepam (Ativan and others), loxapine (Loxitane and others), methylphenidate (Ritalin and others), mirtazapine (Remeron), naltrexone (ReVia), nefazodone (Serzone), olanzapine (Zyprexa), paroxetine (Paxil), pemoline (Cylert), perphenazine (Trilafon and others), phenelzine (Nardil), phenytoin (Dilantin and others), pimozide (Orap), propranolol (Inderal and others), quetiapine (Seroquel), risperidone (Risperdal), sertraline (Zoloft), thioridazine (Mellaril and others), topiramate (Topamax), trazodone (Desyrel and others), valproic acid (Depakene and others), venlafaxine (Effexor), zolpidem (Ambien).

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