Key Words: major depression, treatment guidelines, algorithms, Texas Medication Algorithm Project

Algorithms in Clinical Psychiatry: A Stepped Approach Toward the Path to Recovery

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ABSTRACT *~ The use of clinical practice guidelines and treatment algorithms has become increasingly prevalent across all fields of medicine. The Texas Medication Algorithm Project has developed algorithms for major depressive disorder to facilitate clinical decision-making by providing physicians with a detailed, yet concise, summary of current clinical data on available pharmacotherapeutic interventions, together with specific treatment strategies and tactical recommendations. The goal of the algorithm is the attainment of full and sustainable remission of symptoms. Clinical experts, practitioners, and administrators, as well as patients and their families, all contributed to the formulation and implementation of the algorithm in order to ensure an optimum level of effectiveness and practicality. It is hoped that algorithm-driven pharmacotherapy of depression will increase the quality of care, leading to improved patient outcomes, reducing unnecessary practice variation, and increasing the overall cost-effectiveness of treatment intervention.* Psychopharmacology Bulletin. *2002;36(Suppl 2):142-149*

Introduction

In recent years, there has been a drive to ensure that advances in medical therapy are reflected in routine clinical practice. In that respect, the use of clinical practice guidelines and treatment algorithms have become increasingly prevalent across all fields of medicine.[1-3] The need for such guidelines has arisen partly as a result of the ever-increasing volume and complexity of medical knowledge that has accompanied the emergence of newer treatment options. It has been estimated, for example, that more than 30,000 articles are entered into the US National Library of Medicine's database every month,[4] making it difficult for physicians to stay informed of medical updates.

The development of practice guidelines has also been driven by increased cost-awareness, with healthcare providers under increasing pressure to improve cost-efficiency. As a result, many organizations are evaluating the quality of the available data and integrating the findings into a coherent model, both to simplify the clinical decision-making process and to optimize the therapeutic and pharmacoeconomic outcomes of intervention.

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This article will review the rationale behind the development of available guidelines for the management of major depressive disorder (MDD), with particular focus on the Texas Medication Algorithm Project (TMAP). This project, which commenced in 1995, is a public-academic collaborative effort initiated to develop, implement, and evaluate treatment algorithms for the management of the principal mental health disorders affecting public sector patients, namely MDD, schizophrenia, and bipolar disorder.[5]

Why Algorithms?

Evidence-based guidelines for the management of MDD have been developed by many national organizations, including the American Psychiatric Association[6] and the British Association for Psychopharmacology.[7] The US Agency for Health Care Policy Research (now the Agency for Health Care Research and Quality) has also developed guidelines aimed at primary care practitioners.[8] For the most part, these guidelines tend to be compatible. However, while they clearly provide a structured synthesis of relevant data, they tend to be overly comprehensive and generalized, providing only minimal strategic and tactical guidance.

Treatment algorithms are generally more specific and prescriptive than practice guidelines.[9] Whereas guidelines often simply list current treatment options and the associated scientific evidence, algorithms aim to integrate available research data and clinical experience into a step-by-step framework, which can be used to guide clinical decisions at the time of service delivery. Consequently, use of algorithms should result in more rapid and/or fuller responses to treatment, as well as promoting consistency of care across healthcare providers. As shown in Table 1, use of algorithms should also have administrative benefits, promoting more cost-effective use of resources as well as making costs more predictable.

The Texas Medication Algorithm Project

TMAP is a public-academic collaborative effort initiated to develop, implement, and evaluate evidence-based treatment algorithms for the management of the principle mental health disorders affecting public sector patients, namely MDD, schizophrenia, and bipolar disorder.[5] The algorithm for MDD was developed by a consensus panel which included expert academic clinicians and researchers, practitioners who planned to implement the algorithm, administrators, and patients and their family members.[10]

The TMAP depression algorithm presents strategic and tactical recommendations for acute treatment, as well as continuation and maintenance therapy (Figures 1 and 2). The algorithm is response-driv-

en, with the ultimate goal of intervention at all stages being complete remission of symptoms coupled with prevention of relapse and recurrence. All stages include several strategic treatment options and tactical approaches, which can be tailored to the individual patient. Proven treatments are recommended as first-line options, with the earlier stages of the algorithm also tending to involve less complex treatment regimens in terms of dosing requirements and adverse event profiles than the later stages. Recommended antidepressants for first-line use include selective serotonin reuptake inhibitors (SSRIs), the serotonin and norepinephrine reuptake inhibitor venlafaxine, bupropion, and nefazodone. Tricyclic antidepressants (TCAs) are not considered to be an appropriate first-line treatment option due to their less favorable adverse-event profile and high risk of toxicity.[11] SSRIs are listed first, based on their efficacy in both acute and maintenance phases, minimal need for dosage titration, overall favorable adverse-event profile and length of available clinical experience.[11,12] Results of a recent meta-analysis and pooled analysis demonstrate an advantage of venlafaxine over SSRIs (Figure 3).[13,14] In addition, venlafaxine and some TCAs appear to have enhanced efficacy in severely depressed patients and those with treatment-resistant depression.[15]

An adequate trial of therapy, defined as treatment for at least 6–8 weeks at a recommended dosage, should be ensured in all cases. Recommended tactics to achieve this include regular patient monitoring (ideally every 1–2 weeks at the start of treatment) and dose adjustment. Although augmentation is permitted at all stages, a change

TABLE 1

Clinical and Administrative Reasons for Using Treatment Algorithms

Clinical
- Facilitate clinical decision-making
- Improve quality of care
- Conveniently list options for appropriately tailoring treatment to individuals
- Make treatment plans consistent across sites and physicians
- Provide adequate clinical documentation

Administrative
- Improve cost-efficiency of treatment
- Make costs more predictable
- Define where new medications fit for optimal clinical outcomes
- Provide a basis for defining when new medications are cost-effective
- Define costs related to specific treatments or outcomes
- Provide adequate clinical documentation

Source: Rush AJ, Crismon ML, Toprac MG, et al. Consensus guidelines in the treatment of major depressive disorder. *J Clin Psychiatry*. 1998;59(suppl 20):73-84.

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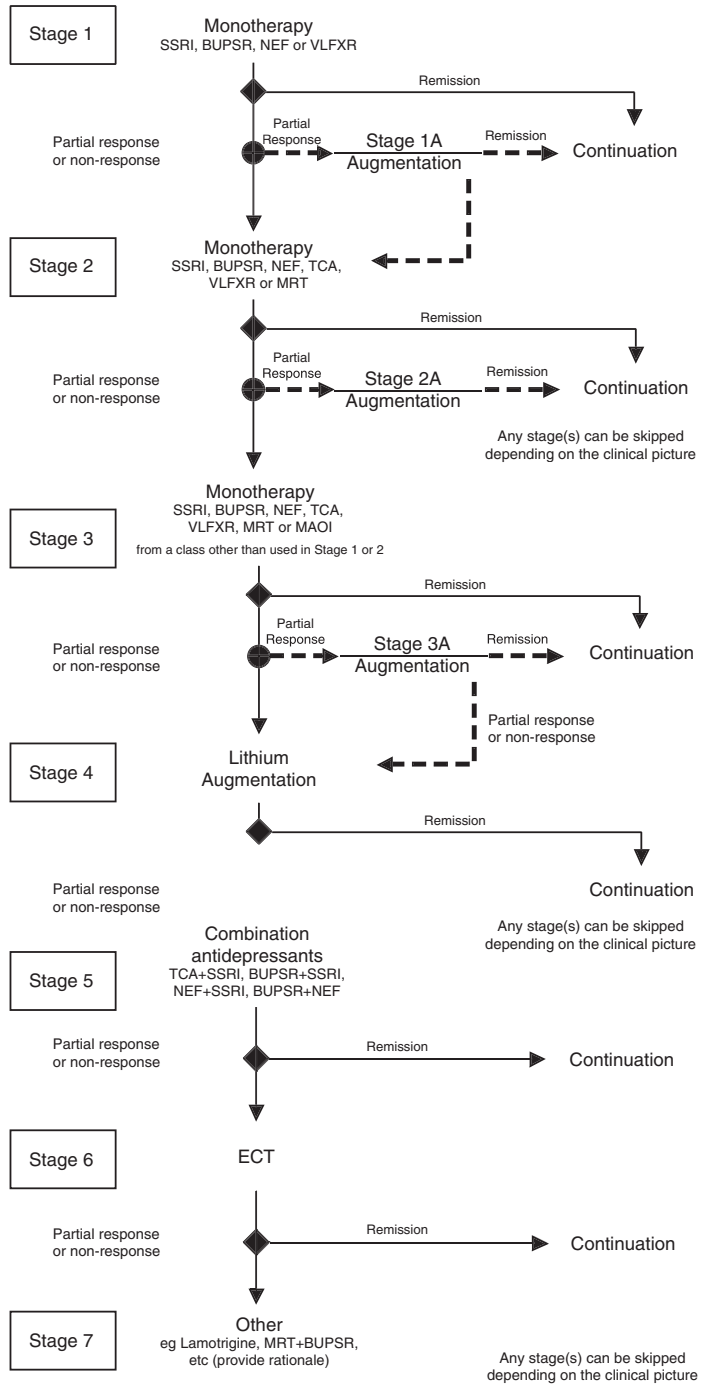
FIGURE 1

Strategies for the Treatment of MDD Without Psychotic Features



MDD=major depressive disorder; SSRI=selective serotonin reuptake inhibitor; BUPSR=bupropion sustained-release; NEF=nefazodone; VLFXR=venlafaxine XR; TCA=tricyclic antidepressant; MRT=mirtazapine; MAOI=monoamine oxidase inhibitor; ECT=electroconvulsive therapy.

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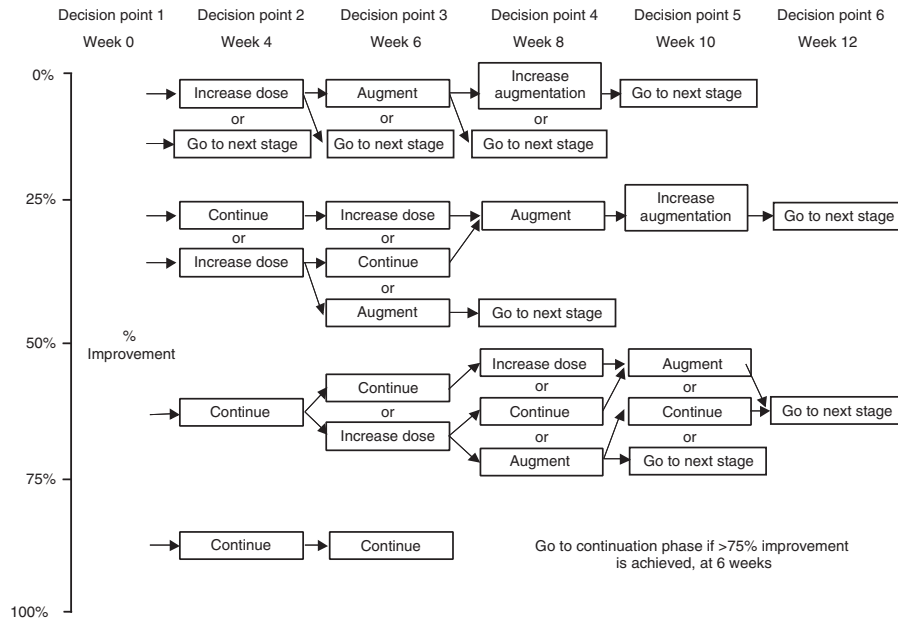
of therapy should be considered in patients who fail to respond fully to an adequate trial of a given medication. Indeed, available data indicate that switching to a new antidepressant results in clinical response in 50% of patients failing to respond to current antidepressant monotherapy.[16] In general, it is recommended that patients switch to a different class of antidepressant than that used in Stage 1, particularly in patients experiencing unacceptable adverse events. Use of venlafaxine extended release (XR), a TCA, or a monoamine oxidase inhibitor (MAOI) is recommended for patients who have experienced worsening of symptoms, as available data suggest that these agents may be more effective than other antidepressants in severely depressed patients.[15] Lithium augmentation may also be considered for more severely depressed patients (Stage 4). For patients with treatment-resistant disease (Stage 5 and upwards), combination therapy may be most appropriate. There is less clinical evidence to support later strategic recommendations.

Patients may enter the algorithm at any stage according to clinical features such as symptom severity, the presence or absence of comorbid conditions, and treatment history. Since depression tends to follow a chronic and recurring course, patients who achieve a satisfactory clinical response should receive continuation phase treatment and remain on therapy for up to 20 weeks at the effective dose used during the acute

FIGURE 2

Tactics for the Treatment of MDD Without Psychotic Features



MDD=major depressive disorder.

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phase. Patients with a history of relapse should receive maintenance therapy at the same effective dosage.

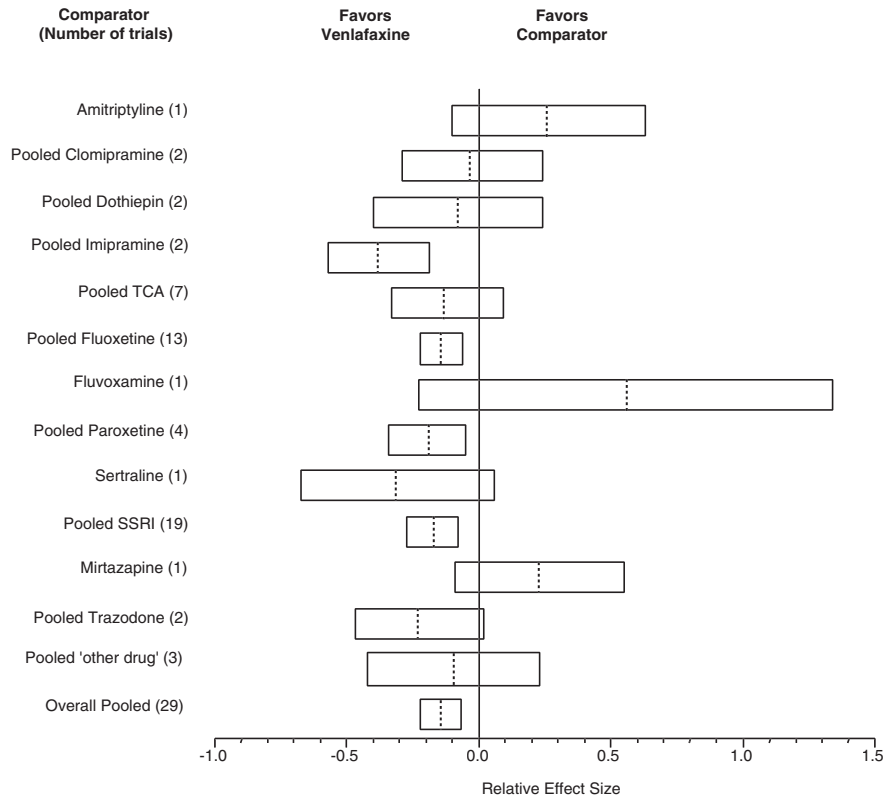
Algorithm development should be a dynamic process—strategies and tactics will require modification as a result of emerging clinical trial data and as new pharmacologic agents become available. It is anticipated that the TMAP depression algorithm will be reviewed at least annually. Ongoing revisions can be accessed at www.mhmr.state.tx.us/meds/tmap.htm.

Validation and Implementation Issues

A major issue in algorithm development is ensuring that these guidelines are used in clinical practice. Indeed, studies have shown that merely publishing treatment guidelines or making them available through continuous medical education programs is generally ineffective, having minimal effect on practice patterns.[17-19] However, few attempts have been made to evaluate

FIGURE 3

Meta-Analysis of Available Data Comparing Venlafaxine and SSRIs



TCA=tricyclic antidepressant; SSRIs=selective serotonin reuptake inhibitors.
Adapted from: Anderson IM. The efficacy and tolerability of venlafaxine compared with other antidepressants in depression: a meta-analysis. Poster presented at: Annual Meeting of the British Association of Psychiatry; July 2001; Harrogate, England.

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the actual clinical utility of specific treatment algorithms or their potential impact on patient care to date. In one study evaluating the effectiveness of guidelines for a collaborative model for the management of depression in the primary care setting, treatment outcomes were found to have improved compared with those seen in patients receiving usual care.[20]

The TMAP depression algorithm is one of the first to be fully validated in the clinical setting. Feasibility testing found it to be effective, with approximately 50% of patients achieving a 40% reduction in symptom severity within 90 days of treatment initiation, and 38% attaining a reduction in symptom severity of 50%.[21] The TMAP depression algorithm was also designed to provide for freedom of clinical input, since this is likely to increase physician acceptability and uptake. Feasibility testing confirmed this to be the case; most physicians adhered to the algorithm with only minor variations in dosages. Almost 75% of the physicians testing the algorithm believed patient care had improved as a result, with the great majority (85%) indicating that they would continue to use the algorithm in routine clinical practice. Studies are ongoing to further determine the impact of the TMAP depression algorithm on clinical and economic outcomes.

Patient education as well as clinician and administrative support systems are clearly required to encourage and facilitate algorithm uptake and implementation. Information support systems, such as computer-assisted clinical decision support systems (CDSSs), may also promote the use of algorithms in clinical practice, offering the advantages of integrated multiple functions in a dynamic and user-friendly system, in which patient data, pharmacologic information, prescription writing, laboratory results, and administrative functions can be cross-linked. Many studies document the fact that the use of CDSSs in clinical practice can improve clinical performance and patient outcome, while saving time and reducing the risk of dosing error or drug-related adverse events.[3,22] Potential disadvantages associated with the use of CDSSs include issues of patient privacy, which is particularly pertinent in psychiatric patients, and physician concerns over the potential loss of autonomy.

Conclusion

The TMAP depression algorithm is one of the first to be fully validated in the clinical setting. This algorithm was developed by a combination of expert panelists from all aspects of psychiatric care, including healthcare professionals and administrators, as well as patients and their family members. The TMAP algorithm is intended to be a useful and accessible adjunct to the clinical treatment and management of patients with MDD. Unlike most other available practice guidelines, the TMAP depression algorithm actually provides specific recommendations regarding the type of treatment recommended (strategies) and optimum methods of use (tactics) for acute, con-

tinuation, and maintenance therapy across all stages of depression. It is hoped that algorithm-driven pharmacotherapy of depression will increase the quality of care, leading to improved patient outcomes, as well as reducing unnecessary practice variation and increasing the overall cost-effectiveness of treatment intervention. ✤

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