VIEWPOINT

Chemical restraint for severe acute behavioural disturbance: what do we know?

Control farmacológico en el síndrome confusional agudo. ¿Qué sabemos?

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Introduction

Severe Acute Behavioural Disturbance(SABD) involves irritability, excessive motor or verbal activity and poor co-operation. It can be associated with suicidality or homicidality. Aggression and assault is common[1]. Seclusion and various restraint techniques are often used in combination or alone to prevent harm to patients or staff[2].

Control measures vary throughout the world. They include verbal restraint, behavioural strategies, environmental seclusion, physical restraints, the use of control weapons and sedation. These control measures have variable risk of harm that should be considered relative to the risk from the SABD[3-5]. Lowest risk options are used preferentially with escalation to restraint by lawful physical or chemical sedation when they fail. Most jurisdictions have legislation authorising medical interventions when appropriate. Clinicians should be familiar with local statutes and mental health legislative requirements including documentation to ensure interventions are legal.

Causes for SABD vary but alcohol and drugs misuse rather than pure mental health issues is the most common cause[3,6]. Organic illness is the least common.

Chemical restraint usually requires initial physical restraint. Large numbers of personnel are required for physical restraint until chemical sedation is effective creating an urgency for adequate chemical control. Serious incidents including unexpected death of young adults can occur during restraint[7,8].

Qualification

Agents discussed in this article have variable availability and restrictions in different countries. For example, droperidol is not currently licensed to be used for sedation in Spain and additionally has a black box warning in the United States. Practitioners should ensure compliance with all regulations in their country of practice.

What are we trying to do?

With chemical restraint we are aiming to have a compliant patient who is conscious or easily roused from light sleep with intact protective reflexes. Current sedation agents are imperfect with no ideal agent known. Desired characteristics include rapid onset, predictable dosing and effectiveness, easy administration to an uncooperative patient, wide therapeutic index and minimal adverse event profile.

The current evidence base is from observational studies of limited power. These studies have answered some critical questions and dispelled some myths. This paper will focus on chemical sedation for SABD presenting to an Emergency Department (ED).

Environmental considerations

The typical environment for SABD is initially poorly controlled. Sedation is only required when simpler de-escelation measures fail. Initial physical restraint should best be provided by staff trained in approved restraint and compliance techniques. This reduces risk of injury. However, even correct restraint techniques can injure patients or staff[5].

The SABD patient will be in an unmonitored environment initially. Constant visual observation of airway, respiratory status and conscious level during physical restraint and initial sedation by a lead clinician is required. After sedation general visual observations, vital sign monitoring and supportive care should be maintained till awake. Oxygen therapy is recommended as some adverse events are less likely. Examination and investigations for organic illness when suspected are undertaken once sedated. Security staff should assist placing the sedated patient in the left lateral position for airway protection and only leave when sedation is effective. SABD can recur without warning so further physical restraint and "rescue" medication options should be available".

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Table 1. Sedation Assessment Tool

SAT Score	Responsiveness	Speech
+3	Combative, violent, out of control	Continual loud outbursts
+2	Very anxious and agitated	Loud outbursts
+1	Anxious / restless	Normal / Talkative
0	Awake / calm	Speaks Normally
–1	Asleep,rouses if name is called	Slurring or slowing
–2	Responds to physical stimulation	Few recognisable words
–3	No response to stimulation	Nil

How do we measure SABD severity and responses to treatment?

A recent useful tool called a sedation assessment tool (SAT)[9] was designed for sedation trials in Australia (Table 1). This describes the responsiveness and speech of the patient with a simple derived sedation score that clearly indicates the severity of the behavioural disturbance and also the level of sedation. A SAT score of +2 or +3 usually indicates sedation is required. Patients with a lower SAT score insisting on leaving with known safety risk may also require sedation. SAT scores are typically charted during sedation with vital sign observations for safety thresholds (Table 2). The chart acknowledges that observations may be limited due to SABD and data is only entered if it is available.

What expectation of effectiveness?

Effectiveness is variably described between studies as asleep or behaviour controlled whether awake or asleep. We prefer effectiveness to be described by SAT scores that clearly indicate conscious state and behaviour. A SAT of 0 or -1 indicates ideal sedation effectiveness. A score of -3 is consistent with being deeply unconscious and without response so is considered oversedation. Oversedation has higher risk of airway and other adverse outcomes particularly if prolonged[6]. These patients also have longer ED stays.

Most common agents have an effectiveness range of 55-90%. This most commonly with first dosing. However some variation in effectiveness reported depends on variable measured times, dosing regimes and criteria from sedation[3,5,6,8,10-12]. Most initial non responders will be controlled by a second dose of the same drug. A small group of patients commonly reported in ranges of 3-10% remain resistant to initial sedation attempts and are more difficult to control.

Time to effective sedation is variably reported and ranges from 5-120 minutes after one or more doses. An onset at 5-20 minutes from initial drug dosing is most commonly reported. It varies with agent, route and exact study method.

What route?

Offering and negotiation for oral sedation when agitation is first evident will in some instances prevent escalation to SABD.

The intravenous route is titratable and has more rapid onset after administration. This theoretical advantage led to its recommendation for some decades. Catheter insertion is often difficult and time consuming in a non cooperative patient. An interesting study by Isbester et al.[5] compared time from code black (ie security call for restraint and sedation) till time behaviour was controlled (measured as security could leave) and this was shorter with intramuscular route than intravenous route. This "real world" study contrasts with previous reported studies favouring intravenous use that just reported time from drug administration not allowing for delays in placing the intravenous catheter.

The Intramuscular route is our currently preferred route based on that study[5] and reinforced by our prior study experience where medical, nursing and security staff given a choice increasingly preferred intramuscular as technically easier, safer and with an acceptably rapid effect[6].

Which agent as first choice?

Specific agent choice has wide variation throughout the world. This likely indicates that there is no universally accepted best agent. It also reflects variable agent availability in different countries. Common agents include benzodiazepines (eg lorazepam, midazolam), major tranquillizers (eg chlorpromazine), newer antipsychotics (eg olanzapine) and neuroleptic butyrophenones (eg haloperidol, droperidol).

Two agents combined when compared with a single agent have been shown to potentially work faster with reasonable safety profile in at least two studies[12,13]. Conversely, one agent appeared quicker in onset compared to combination drugs during an earlier study[14]. Studies to date have not been adequately powered to

Table 2. Sample observation chart for sedation of severe behavioural disturbance

Time: _____	__:__	__:__	__:__	__:__	__:__	__:__	__:__	__:__
Sedation score at baseline								
Sedation score (+3 to –3)	__:__	__:__	__:__	__:__	__:__	__:__	__:__	__:__
RR > 12 (Tick boxes if Yes)	☐	☐	☐	☐	☐	☐	☐	☐
O_2 Sats (RA) > 90%	☐	☐	☐	☐	☐	☐	☐	☐
Pulse > 60	☐	☐	☐	☐	☐	☐	☐	☐
Systolic BP > 90	☐	☐	☐	☐	☐	☐	☐	☐
Additional sedation?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Drug given and dose								

Staff or patient injury, any adverse effects or events.

answer theoretical concerns regards potential higher risk of adverse effects from combination drugs.

Our current preferred parenteral first choice agent is intramuscular droperidol at a dose of 10mg for adults aged less than 65 years[3,15,16]. This based on recent studies that show adequate smooth sedation, acceptable onset time to control of behaviour, low need for rescue medication and commonly predictable dosing without fear of excessive sedation[3,5,16]. A standardised IM sedation protocol has been found to be simpler, more effective than and as safe as an IV protocol[5]. Intramuscularly, droperidol acts fast whilst having few adverse outcomes, making it an excellent drug of choice for an IM sedation protocol for SABD[2,15,16].

In 2001, droperidol was withdrawn from the United States of America market after the US FDA issued a black box warning for concerns about QT prolongation and Torsades de Points[3]. This was based on MedWatch reports, which are not peer reviewed data[2]. Previous to this time, it was used for SABD for decades with a good safety record[17,18]. No clinical trial or systematic review has ever reported any adverse cardiac events in SABD use and two randomised controlled trials conducted since have found no correlation[19]. So far, the evidence is not convincing for a causal relationship between low doses of droperidol in healthy individuals and sudden cardiac deaths[20,21]. Many believe the FDA acted precipitously in their decision to remove it from the market[2]. Deaths due to droperidol have been seen to be associated with massive doses, electrolyte disturbances and pre-existing cardiac dysrhythmia[2,7,21]. Additional caution seems to only be necessary if any of these aforementioned features exist or the patient has a family history of long QT or has also been given another medication that is known to prolong the QTc[21]. The DORM2 trial[16] has reinforced the safety profile for SABD use and further allays concerns regards QTc prolongation.

We now rarely use shorter acting benzodiazepines as first choice due to larger variability of dose-response, slightly higher rescue medication need and marginally greater safety risks[3,6,16]. The general effectiveness for benzodiazepine sedation is however similar to droperidol

What dose?

The biggest risk from excessive dosing is induction of deep levels of sedation or general anaesthesia with loss of protective reflexes. Therefore, excessive or too frequent dosing is discouraged[6].

Drug companies do large studies to decide safe dosing on normal populations. It was speculated that SABD patients were not normal populations and needed higher doses of sedation due to the severe agitation.

Droperidol dosing has been studied specifically in the SABD population below 65 years to justify a higher 10 mg dosing[3,16]. Australian manufacturers now supply 10 mg in two millilitres ampoules to give a reasonable volume for intramuscular dosing.

Studies of midazolam do not support universal higher dosing. They show that most SABD patients require normal dosing[6]. Higher doses of midazolam should therefore only be given by titration after normal dosing has been ineffective.

For other agents that have not been studied at higher doses in SABD we recommend normal population therapeutic doses be used initially and only titrated upwards if ineffective.

How many doses and which agent if resistant?

Failure to achieve sedation with the first dose is an anxiety provoking situation. It is important to give drugs adequate time to be effective before further dosing. Our practice is to give intramuscular doses at a minimum of 15 minute intervals. More rapid dosing can lead to inadvertent overdosing[6].

Our usual practice if behaviours are moderating at 15 minutes is to wait up to 15 minutes longer. If that fails or behaviour is not moderating at 15 minutes we give up to two standard doses of our first choice agent. If these are ineffective we do not persist with that agent or that same class of drugs and believe it more rational to use a different class of drug that likely acts on different receptors. Our most common second line agent following droperidol is midazolam at half standard doses. We monitor patients closely as they paradoxically more commonly experience oversedation and other adverse events[6,16] when actual sedation is achieved. It is suspected from observation that the agents cumulatively become more effective over a time longer than that allowed by clinicians before further dosing.

Extreme situations

Most epsisodes of SABD that reach medical care have some risk to safety. Usually, there is time to restrain physically and sedate in a standard fashion described above. Rarely, there is immense immediate danger to the patient, community or staff from the uncontrolled behaviour warranting urgent action.

Our preferred strategy is to stun and sedate. Alternate dissociative anaesthetic agents such as ketamine are a predictable rapid stun agent. These preserve vital reflexes and have by limited personal experience and case reports been used successfully in prehospital and hospital environments[22]. Ketamine 5-10 mg/kg intramuscularly has been effective in typically 3-5 minutes. Supplementary sedation with standard agents is then required.

Study on more widespread ketamine use in chemical sedation has been prevented by ethical concerns regards theoretical potential to aggravate SABD, limiting mental state assessments and possible drug induced

psychosis[23]. We therefore limit its use to rare critically dangerous situations.

Induction of general anaesthesia is even more rarely used when rapid and absolute control is required. This however is a higher risk intervention and only recommended as a last resort for clinicians with high anaesthetic skill levels in hospital based practice. It also requires intensive care bed resourcing so is not recommended when safer standard chemical sedation or the above stun and sedate strategy is the more appropriate intervention.

They wake up – what now?

In most instances the SABD will be resolved on waking. Sleep moderates many intoxications, drug induced psychoses and withdrawals. Every patient will need a careful direct and collateral history with physical and mental state examination to identify the underlying causation and future management. Some intoxication, delerium and psychosis will be persistent and require specific interventions and further sedation. Some organic medical conditions will be discovered and confirmed by investigations.

In some jurisdictions mental health assessment may be mandatory. Due to high incidence of alcohol and drug abuse in this population we routinely screen and offer access to appropriate services. Disposition decisions should always consider competency for reasonable decisions, psychosocial matters and safety.

Conflict of interest

The author declare no conflict of interest in relation to the present work.

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