

Usage optimisation of therapeutic agents during a healthcare crisis

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BACKGROUND

There is a high risk of stock shortages for drugs which are heavily consumed, particularly sedatives, analgesics and muscle relaxants.

ACTIONS TO BE TAKEN

- **Organise a local “permanent” contact for communications between intensive care and the pharmacy.**
 - Create an intensive care specialist/pharmacist two-person team.
 - Ensure daily contact with the pharmacy to identify inventory risks and define amounts of drugs available for the purposes of preventing stock shortage (e.g. those drugs monitored by LMR as listed in **Annexe 1**).
 - Adapt practices concerning sedatives as well as their practical use which are in line with the protocol (to be adapted over time).
 - **Annexe 2** is a practical prescription guide developed by Bichat Hospital.
 - Check what specialist drugs are available (concentrations and total quantities may vary in the event of a change in suppliers).
- **Obey - even more strictly than usual where applicable - those general principles in place concerning the administration of sedatives, analgesics and muscle relaxants** (SFAR-SRLF Joint Consensus Conference and international recommendations).
 - International recommendations: [Devlin CCM 2018](#)
 - [SFAR-SRLF Consensus Conference](#)
 - Of particular note, see assessing and managing sedation/pain management (cf. **Annexe 3**. RASS scale implementation procedures are given in **Annexe 4**. Pain assessment using the BPS system for those patients who are not capable of communicating; self-assessment for patients capable of communicating).
- **For each and every medical prescription the following questions should be asked multiple times on a daily basis:**
 - Is the drug prescribed absolutely indispensable?
 - Is it possible to reduce the dose or wean the patient off of it?
 - Is it possible to not have to use an electrical syringe as part of administration?
 - Is the drug prescribed the best fit for purpose out of all of the drugs available (e.g. midazolam and kidney failure)?
- **Adapt the ventilator to the patient, not the patient to the ventilator.**
 - Take into consideration alternative, Aprv-style ventilation methods so as not to have to administer (or readminister) muscle relaxants and/or sedatives/analgesics.
 - Completely rule out the automatic administration of muscle relaxants.
 - In the event muscle relaxant administration is required consider achieving this effect by using iterative bolus doses.
 - If the continuous administration of muscle relaxants is required:
 - With respect to administration:
 - Assess the level of neurological blockade required using a TOF-watch-style monitor (see **Annexe 5**) and adjust the dose as necessary.
 - If such a monitor is not available then consider administering the minimum dose required for an effective neurological blockade and/or withdrawal by “titrating” patients onto ventilation.
 - Concerning sedative/neurological blocking agent combinations:
 - Prioritise monitoring sedation depth using a brain monitor

- If a brain monitor is available, adapt analgesic/sedative doses to the brain monitor readouts pursuant to the protocol in place (see **Annexe 6**).
 - If a brain monitor is not available, consider progressively reducing (without ever completely stopping administration of) these multiple daily doses, eventually aiming to achieving the clinical parameters available:
 - no hypertension, tachycardia or maladaptation or modification of breathing loops.
- If the patient is not receiving muscle relaxants:
 - Consider prioritising analgesics over sedatives.
 - Implement a systematic monitoring protocol for sedation depth.
 - Implement a sedative adaptation protocol which includes assessing multiple daily doses (minimum one each nurse's shift).
 - Consider prescribing dexmedetomidine during the withdrawal phase.
 - Inasmuch as possible consider prescribing combination sedative/analgesic treatment to save on the amount of drug use and reduce risk of dependency developing:
 - clonidine (maximum 900 µg/24h)
 - gamma-OH (see **Annexe 7**)
 - ketamine as analgesic (around 1 mg/kg/h)
 - Consider sedation using halogenated anaesthetics which are adapted to intensive care use to reduce consumption of the more commonly prescribed neurological blocking agents and hypnotics (sevoflurane with an AnaConDa or Mirus system). Medical and paramedical training however will be required prior to using this technique (see **Annexe 8**).
 - Consider prescribing other benzodiazepines if midazolam stock is limited.
 - Consider short prescriptions of neuroleptics such as loxapine, haloperidol or levomepromazine with sedative relays to prevent withdrawal syndrome (such as neuroleptic correctors, particularly in younger patients: tropatepine 10mg/day via nasogastric intubation or trihexyphenidyle).
- **Consider semi-early tracheotomies as a means of limiting sedative use.**
 - Alongside proposals concerning the creation of ventilation withdrawal units during intensive care ([see dedicated group proposals](#)).
- **Optimise treatment use by caregivers and limit waste inasmuch as possible (see Annexe 9):**
 - Prior to each use: check which specialist drugs are available, concentrations and total quantities (as there is a risk of concentrations changing, particularly as related to changes in suppliers over time).
 - Use the whole of the content of a syringe prior to changing over to a new syringe.
 - Take all measures to avoid the programmed refilling of a syringe if it has not been completely used.
 - Do not change out tubing (just the syringe, this gives us around 2 ml more).
 - Do not immediately dispose of syringes after stopping the administration of sedatives/analgesics as the product is stable in the syringe for several hours and sedatives/analgesics may possibly be reintroduced.
- **Concerning shortages in electrical syringe needles:**
 - For combination sedative/muscle relaxant treatment consider mixing hypnotics and morphinomimetics in the same syringe.
 - The list of drugs which can be mixed in a single drip has been given in **Annexe 10**.
 - Consider prioritising subcutaneous insulin prescriptions over intravenous prescriptions.
 - Alternative solutions are currently being discussed within the AGEPS.
- **Concerning end-of-life patients and deep, continuous sedation up until death:**
 - Consider using other drugs compared to the more commonly prescribed drugs (e.g. diazepam).
 - Prioritise drug perfusion which does not involve the use of electrical syringes.