JIVD 2022 Conference highlights report

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Presentation 1 – How, when and where should we introduce NIV in ALS patients?[1]

Presenter: Prof Jesus Gonzalez

The main reasons to decide to ventilate ALS patients are:

- To reduce symptoms
- To improve the quality of life
- To increase survival.

WITH REGARDS TO WHEN TO START NON-INVASIVE VENTILATION (NIV)

The European guidelines,[2] recommend that NIV should be initiated considering three main aspects: firstly symptoms like dyspnoea, orthopnoea, disturbed sleep, Epworth sleepiness score > 9. Secondly respiratory tests with an forced vital capacity (FVC) cut-off of 80% or sniff nasal inspiratory pressure (SNIP) < 40 cmH_2O and thirdly, hypoventilation documented by daytime arterial $PaCO_2$ > 45 mmHg or significant nocturnal desaturation on overnight oximetry. The European guidelines and other studies[3,4] show that when NIV is introduced at the very beginning of the respiratory dysfunction but still with a high FVC, we can have a better outcome and increased survival. Nevertheless, when NIV is initiated in patient with a high FVC, adherence is not optimal[5]. A Spanish study[6] aimed to show that early NIV improves outcomes for ALS patients but, this study had to stop due to lack of inclusions. The reason for the lack of inclusion was, because many patients refused it. Moreover, FVC is not able to predict the degree of diaphragmatic dysfunction while inspiratory capacity and SNIP seems to be better predictors. We might find in the clinical practice patients with an elevated vital capacity, but very compromised diaphragmatic function[7]. In the future, ultrasound may be an important tool to non-invasively study diaphragmatic dysfunction and atrophy[8]. The new paradigm may be that symptoms and hypoventilation (either nocturnal and diurnal) are the main reason to start to ventilatory support. With respiratory function being useful to suspect hypoventilation.

THINKING ABOUT WHERE TO START NIV?

NIV may be commenced in hospital, as an out-patient and a Portuguese study has proven NIV could be done perfectly at home too[10]. NIV should be commenced as soon as possible when NIV is indicated. Starting at home may decrease the delay of intervention. If the delay is too long, the patient is going to become symptomatic, is at risk of acute respiratory insufficiency and survival decreases very quickly[9].

HOW SHOULD NIV BE STARTED?

It is not easy to ventilate ASL patients, so it must be done by experts. NIV optimisation requires an individualised approach to respiratory management tailored to the different needs of each patient. An important aspect is not how to choose the equipment, the mode or the setting, but the monitoring and follow-up of the patients. We should also be experts in monitoring leaks and upper airway obstruction during ventilation, because this leads to sub optimal ventilation which, impacts mortality[11,12]. Different studies have shown that the most important reason for sub optimal ventilation is upper airway obstruction and that it may happen due to different mechanisms, as documented by laryngoscopy[13]. Moreover, in the clinical practice, in order to improve the effects of NIV, the management of ALS patient is very complicated and requires the collaboration of different experts like occupational therapist for changing the mask every 3 months, intensivist for patients who need tracheostomy, physiotherapist for secretion clearance due to impaired cough, neurologist for hypersalivation, palliative teams for treating dyspnoea persisting in some patients despite a optimal ventilation[14].

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Presentation 2 – Tracheostomy and ALS: is it still an option?

Presenter: Capucine Morelot-Panzini

ALS is a neurodegenerative disease that affects oropharyngeal muscles, limb muscles and respiratory muscles. The delay between the first symptoms and the diagnosis of ALS is 12 months and the death occurs in 3 to 5 years due to respiratory paralysis. The prognosis is worst in bulbar onset. An important thing to keep in mind, is when we should discuss about tracheostomy in ALS patients. There are differences in progression of hypoventilation in patients with ALS, rapid progression > 4 patients per month, intermediate 2–4 patients per month, slow progression < 2 patients per month,[1] leading to a different prognosis. Non-medical factors like legal, social, religious beliefs and economic background, may influence the choice of tracheostomy insertion. There are also wide differences among different countries. According to an epidemiological study,[2] tracheostomy insertion is often used in countries like Japan (27–45%), but not used at all in UK (0%). The main concern around the decision of tracheostomy insertion is, quality of life as they are at high risk of pneumonia and depression. One Italian study[3] showed that tracheostomised patients after an acute respiratory failure and without anticipated directives, had no agreement between desired and achieved goals and no different prevalence of depression. Another factor we must keep in mind when talking about tracheostomy in ALS patients is the quality of life of caregivers. A German study[4] compared two groups of patients and their caregivers: one with NIV and the other one with tracheostomy. They found, 75% of caregivers would choose again for their parents' to have a tracheostomy and 97% would choose NIV. But, when asked to choose for themselves only in 50% of cases tracheostomy and 94% would want NIV. The main reasons for this choice was the high burden of care for patients with tracheostomy's. Care givers have less time for themselves or and other members of the family, they also reported a high sense of responsibility, high emotional burden and sometimes they have to quit their jobs, to provide care[5]. A third concern in ALS patient is the impaired communication due to a locked-in state[6]. This occurs in the majority of tracheostomised ALS patients, in particular when tracheostomy is performed 24 months after the onset of ALS[7]. A finial concern is the cognitive function of ALS patients. A recent study,[8] showed that one third of patients have cognitive and behavioural impairment, 3 months after diagnosis and another third after 7 months from diagnosis. So, it is important to know the level of cognitive impairment when patients are contemplating whether to have a tracheostomy. Usually there are no anticipatory directives prior to tracheostomy insertion. Patients where a care plan is in place, the care plan was almost always in patient's for whom palliative care was activated[9]. In these patients, it is extremely important to have multidisciplinary management,[10] and most of all the palliative care unit for the control of the end life symptoms. The decision of the tracheostomy is an ethical challenge. On one hand we must put in the balance the benefits of tracheostomy as minimising morbidity and maximise quality of life and on the other hand the risks as locked-in state, depression, cognitive and executive dysfunction[2].

In conclusion, in France and Switzerland current practice tends to discourage the use of Tracheotsomy in ALS due to all the negative aspects that come with tracheostomy like lock in syndrome, high burden of

caregivers and the difficulty to unmask cognitive disorders occurring in the evolution of ALS. One exception is for young motivated patients who fail NIV.

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Presentation 3 – Management of oropharyngeal secretions in ALS patients

Presenter: Jesús Sancho

ALS is a neurodegenerative disorder that affects motoneuron. In 30% of cases, patients have a bulbar onset and 80% of them develop bulbar dysfunction[1]. Sialorrhea in ALS patient is very frequent problem. It is not caused by an increased production of saliva but by the inability to swallow secretions due to tongue spasticity, weakness of facial, mouth and pharyngeal muscles and loss of oropharyngeal coordination and function[2,3]. The main consequences of sialorrhea and retained oropharyngeal secretion in ALS is drooling with skin maceration,[4] psychological stress, impairment of dysarthria, aspiration with choking episodes, risk of pneumonia, disturbed sleep and decreased NIV tolerance. There are different scales by which we can measure sialorrhea in ALS patients: Oral Secretion Scale (OSS)[5] (level 4 is normal and 0 level is most severe), Drooling Impact Scale (DIS), Sialorrhea Scoring Scale (SSS), Drooling Severity and Frequency Scale (DSFS), Drooling rating Scale (DRS). Also objective assessment can occur via, Fiberoptic Endoscopic Examination Swallowing (FEES).

Clinicians can act in two possible ways to manage the oropharyngeal secretions:

1. Decrease salivary production: Salivation is mainly mediated through parasympathetic stimulation by acetylcholine binding at muscarinic receptors located at salivary glands. It is possible to control salivary production by using:

a) Anticholinergic drugs: These are considered the first line treatment for sialorrhea, even if few clinical studies support this. The main side effects of this drugs are sedation, dry mouth, thick secretions, skin reactions, urinary retention. Moreover, they are not effective in more than 40–60% of patients[6]. Hyoscine patches, atropine, scopolamine, amitriptyline are mainly used. In a study performed on 10 patient (9 of which with tracheotomy mechanical ventilation) transdermal scopolamine was compared with a placebo sample. Scopolamine can induce a reduction in salivary production, but not at a significant value[7].

b) Botulinum toxin improves sialorrhea by decreasing the release of acetylcholine at the neurosecretory junction. It is injected into parotid and submandibular glands by using anatomical marks, electromiography guidance or ultrasound guidance. There are 2 serotypes of botulinum toxin: BoNT-A and BoNT-B. In various studies there were found no significative differences in efficacy, duration of effect and side effects[8]. One study showed that Toxin type B improves the patients perception in salivary production in the first 2 to 4 weeks compared to placebo[9]. Another study performed on two groups of patients (one with ALS diagnosis and the other one with Parkinson's Disease) treated with Toxin A and Toxin B, showed that there was no significant differences between type A and B. However, the salivary production improves more in Parkinson's Disease patients[10]. In conclusion, in patients who have received this type of treatment, the sialorrhea reduces 3–7 days after treatment, with a maximum reduction in 2–4 weeks after treatment and a duration of the effect for about 3–4 months. The main complications of botulinum toxin injection are: infection of salivary glands, pain and impairment bulbar dysfunction. Most of patient that has received botulinum injection still continued to use anticholinergic drugs.

c) Radiotherapy: This can be done through 2 different modalities, electron-based therapy or photon-based therapy and the most common targets are bilateral submandibular glands and the caudal 2/3 parotid glands. In various studies (10 studies with a total number of 216 patients) including ALS patients and Parkinson's Disease, it was shown that there are no significant differences between electron-based therapy and photon-based therapy, but electron-based therapy seems to be better tolerated and more effective in long term. 81 % of patients reported symptomatic improvement in a median time of 2 months and a duration of improvement from 3 months to 5 years. 40% of patients have developed acute toxicity manifested with dry mouth (19%), mucositis 10%, taste change 8%, skin reaction 6%. 12% of patients have developed long-term toxicity. It is recommended to treat patients with a total dose of radiations of 12 Gy in 2 fractions or 20 Gy in 4 fractions.

d) Surgery: it is possible to control salivary production by removing submandibular salivary glands, by relocating or ligating submandibular and/or parotid duct or by performing trans tympanic neurectomy. A meta-analysis concluded effectiveness of this technique in 80 % of patients[11]. However most of published studies have been performed on children with cerebral palsy. Surgical interventions are not recommended in ALS patient due to low life expectancy and the inability to tolerate surgical interventions due to respiratory problems[12,13].

2. Remove oropharyngeal secretions by using two different devices:

a) Mechanical insufflation-exsufflation device

b) Suction with convectional catheter

Another issue for the ALS patient is thick oropharyngeal secretions. The management in this case would be firstly appropriate hydration and the use of drugs like mucolytic agents and beta blockers. A study, including 17 ALS patients with thick and tenacious secretions treated with propanolol (10 mg) or metoprol (25 mg), has shown that 12 patients (75%) have reported a decrease in the thick secretions at the first week of treatment[14]. Despite the interesting results of this study, more data are needed about the use of beta-blockers on ALS patients.

In conclusion, the steps to digest in the management of secretions in ALS patients may be: anticholinergic drugs in mild secretions, botulinum toxin in moderate secretions and radiotherapy in severe secretions with a follow-up in 1–3 months.

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