

## DECISIONS MAKING ABOUT ANAESTHETIC CONDUCT IN MYASTHENIC PATIENT

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*[Percorsi decisionali nella condotta anestesiológica del paziente miastenico]*

### SUMMARY

The authors after analyzing the importance of the involvement of the respiratory muscles of myasthenic patient and his worsening owing to special situations such as fever, pregnancy, surgery, administration of different types of drugs and general anesthesia, focus on survey of five patients come to their observation. They stress the importance of the severity of the disease and reporting their decisions processes undertaken during the preoperative clinical evaluation, the conduct of anesthesia and the postoperative, control shows the results obtained.

They conclude by stating that the particular sensitivity of these patients, related to the impairment of respiratory function and the possible delayed recovery of the forces, both situations that can lead to serious complications and result in death in the case of an unsuitable or non-targeted anesthetic choice.

**Key words:** Autoimmune disease, weakness, preoperative evaluation, anesthetic risk, anesthetic implications

### RIASSUNTO

*Gli Autori, dopo avere analizzato l'importanza del coinvolgimento della muscolatura respiratoria del paziente miastenico ed il suo aggravamento in seguito a particolari situazioni quali stati febbrili, gravidanza, interventi chirurgici nonché somministrazione di diverse tipologie di farmaci ed anestesia generale, si soffermano su una casistica di cinque pazienti accorsi alla loro osservazione. Sottolineano l'importanza del grado di severità della patologia e riportando i percorsi decisionali intrapresi durante la valutazione clinica preoperatoria, la condotta anestesiológica ed il controllo postoperatorio mettono in evidenza i risultati ottenuti.*

*Concludono affermando la particolare fragilità di tali pazienti, legata alla compromissione della funzione respiratoria ed al possibile ritardato recupero delle forze, situazioni che possono comportare serie complicanze e residuare in exitus nel caso di una non idonea o di una non mirata scelta anestesiológica.*

**Parole chiave:** Patologia autoimmune, ipostenia, valutazione preoperatoria, rischio anestesiológico, implicazioni anestesiológicas

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### Introduction

In about 85% of myasthenic patients the hyposthenia gradually becomes generalized until a serious involvement of the respiratory muscles requiring respiratory support or intubation. The current therapeutic possibilities with anticholinesterasic drugs allow myasthenic patients to lead a completely normal life, if properly treated. We must emphasize the possibility of sudden worsening of the disease during events or circumstances in the ordinary course of life of each individual: fevers of various kinds, pregnancy, administration of different types of drugs, general anesthesia during surgery. For this last event we want

to pay attention to the perioperative anesthetic conduct in patients with Myasthenia Gravis.

In fact, in these patients at risk, there is a required path for the proper anesthetic procedure. The aim is to demonstrate the importance of careful preoperative evaluation followed by the application of a specific anesthetic protocol up to ensure a postoperative time free of complications.

### Clinical case studies

From January 2008 to December 2009, at the University Hospital "Policlinico Gaspare Rodolico" in Catania, we selected 5 cases of M.G., came to

our attention during the preoperative clinic outpatient assessment, to undergo major abdominal surgery. The severity of the conditions of different patients was assigned on the basis of a classification system divided into stages, prosed by MGFA (Myasthenia Gravis Foundation of America); in particular:

- 2 cases, stage II B
- 2 cases, stage III B
- 1 case, stage V

For each case have been undertaken different decision processes about the best anesthetic choices to meet the demand of an intraoperative course and postoperative convalescence free of complications.

### ***Preoperative assessment***

The preoperative assessment lays out the acquisition of information about the patient's clinical conditions trough the instrument of the history and physical examination, defining and quantifying the ASA anesthetic risk, and finally planning perioperative anesthetic strategy. The preoperative evaluation of myasthenic patient must include the severity of the disease and neurological balance trough specialized survey; it is necessary to evaluate the pulmonary function tests and arterial blood gas analysis in ambient air.

The current therapy of the patient can also be changed because it can influence, if commonly followed, the preparation for surgery: drug treatment with anticholinesteratics may be decreased or even suspended the morning of surgery in order to reduce the need of curare.

### ***Anesthesia conduct***

The induction of the patients was achieved after preoxygenation and administration of a hypnotic or analgesic. Intubation was usually done by modified curare dose for myasthenia and mechanomyographic intraoperative control. In the worst case (stage V) was used local anesthetic, sprayed on the vocal cords and trachea, while the patient is sedated with propofol and remifentanyl, thus avoiding the use of curare.

The dosage on the drugs used, depending on the different stage of intraoperative time, is shown in the table 1.

At the end of surgical procedure, trough a

gradual abolition of medication, we have tried to support the awakening and the gradual recovery of consciousness and the various functions (such as spontaneous respiration and airway protection with the recovery of the cough reflex and swallowing).

One hour after surgery it was performed arterial blood gas analysis control in ambient air and it was also assessed respiratory rate.

### ***Postoperative evaluation***

The postoperative course regarding the two cases belonging to stage IIB and stage IIIB was carried out without any complication and it has allowed the transfer of the patient to the ward of belonging. Only the case belonging to the V stage required a postoperative control with admission to the Intensive Care Unit.

In fact, owing to a respirator failure (breaths <8/min and a PaCO<sub>2</sub> > 45 mmHg) it was considered appropriated a proper postoperative check and a reassessment both general and neurological which ensure the complete recovery of the patient.

### ***Discussion***

Several anesthetic techniques have been proposed in the treatment of myasthenic patient but none has proved superior to the others. The current guidelines derived from studies in the literature and the experience gained in the field, lead to support a concept of “mini-invasive anesthesia” or better minimum “drug aggression” to be implemented in patient with M.G. For this disagreement in many cases the preferred approach is directed to the use of recently introduced drugs such us propofol and remifentanyl, to a total intravenous anesthesia (TIVA), or by more recent mode of infusion (TCI site effect or plasma concentration).

These drugs are, in fact, characterized by a high manageability, by a rapid wash-in, a low half life and then by a rapid washout with rapid elimination and minimal side effects. Based on our experience, we propose therefore, according to the latest directives on the field, the use of those drugs which profile handle appears to have a wide safety margin: the hypnotic Propofol, the analgesic Remifentanyl, the non-depolarizing muscle relaxant Cisatracurim (the latter only if it is needed). The risk of complications relating to the use of these drugs, with appropriately modified dose, is very low and therefore perfectly acceptable.

ASES	STAGE	INDUCTION	MAINTENANCE	WAKE-UP
1	I B	<b>Propofol</b> 1,5 mg/kg e.v.; <b>Remifentanil</b> 1-2 $\gamma$ /kg; <b>Cisatracurio</b> 3 $\mu$ g/kg/min.	<b>Propofol</b> 8 mg/kg/h e.v. <b>Remifentanil</b> 0,1-1 $\gamma$ /kg/min; <b>Cisatracurio</b> 1-2 $\mu$ g/kg/min.	<b>Atropina</b> 0,2 mcg/kg e.v. 2-3 min. before the administration of <b>Neostigmina</b> 50-70 $\mu$ g/kg/1min.
2	II B	<b>Propofol</b> 2,0 mg/kg e.v.; <b>Remifentanil</b> 1-2 $\gamma$ /kg; <b>Cisatracurio</b> 3 $\mu$ g/kg/min.	<b>Propofol</b> 10 mg/kg/h e.v. <b>Remifentanil</b> 0,1-1 $\gamma$ /kg/min; <b>Cisatracurio</b> 1-2 $\mu$ g/kg/min.	<b>Atropina</b> 0,2 mcg/kg e.v. 2-3 min. before the administration of <b>Neostigmina</b> 50-70 $\mu$ g/kg/1min.
3	III B	<b>Propofol</b> 1,5 mg/kg e.v.; <b>Remifentanil</b> 1-2 $\gamma$ /kg; <b>Cisatracurio</b> 2 $\mu$ g/kg/min.	<b>Propofol</b> 8 mg/kg/h e.v. <b>Remifentanil</b> 0,1-1 $\gamma$ /kg/min; <b>Cisatracurio</b> 1 $\mu$ g/kg/min.	<b>Atropina</b> 0,1 mcg/kg e.v. 2-3 min. before the administration of <b>Neostigmina</b> 50-70 $\mu$ g/kg/1min.
4	IV B	<b>Propofol</b> 1,5 mg/kg e.v.; <b>Remifentanil</b> 1-2 $\gamma$ /kg; <b>Cisatracurio</b> 2 $\mu$ g/kg/min.	<b>Propofol</b> 6 mg/kg/h e.v. <b>Remifentanil</b> 0,1-1 $\gamma$ /kg/min; <b>Cisatracurio</b> 1 $\mu$ g/kg/min.	<b>Atropina</b> 0,1 mcg/kg e.v. 2-3 min. before the administration of <b>Neostigmina</b> 50-70 $\mu$ g/kg/1min.
5	V B	<b>Propofol</b> 1 mg/kg e.v.; <b>Remifentanil</b> 1-2 $\gamma$ /kg.	<b>Propofol</b> 4 mg/kg/h e.v. <b>Remifentanil</b> 0,1-1 $\gamma$ /kg/min.	—————

**Table 1:** Drugs used during anesthesia procedure

## Conclusions

The Myasthenia Gravis is a disease with many anesthetic implications. Preoperative evaluation of the myasthenic patient is a milestone for proper and complete preparation for elective surgery. The application of a specific anesthetic protocol with appropriate recommendations, allows a perioperative management free from serious complications, avoiding, whenever possible, the admission of patients in Intensive Care Unit.

With our study we tried to show how the post-operative needs a proper analysis of individual patient and how it depends on the choice of a targeted anesthetic technique. The patient affected by Myasthenia Gravis is, in fact, a type of patient who, for the intrinsic peculiarities of the disease itself, has always challenged the Anesthesiologist for the anesthetic conduct.

The particular sensitivity of these patients lies above all in the risk of impaired lung function and this requires a continuous perioperative surveillance by the Anesthesiologist. The task of the latter is difficult because he must constantly seek and recog-

nize the possible exhaustion and reduced muscle tone and the delayed recovery of patient's forces that could lead to major complications: inability to make valid cough, the risk of aspiration pneumonia, episodes of worsening dyspnea and finally acute respiratory failure which can lead to exitus.

## References

- 1) Abel M, Eisenkraft JB. *Anesthetic Implication of Myasthenia Gravis*. The mountainsinai journal of medicine January/March 2002: 32-36.
- 2) Azzolina R e coll., *Esperienza clinica sulla valutazione anesthesiologica preoperatoria nel paziente miastenico*. Acta Medica Mediterranea, 2009; XXVI n.1 pag. 21-22.
- 3) Azzolina R e coll., *Response to anaesthetic drugs in myasthenic patient*. Acta Medica Mediterranea, 2009; XXVI n.1 pag.1-4.
- 4) Kiran U, Choudhury M, Safena N et al. *Sevoflurane as a sole anaesthetic agent for thymectomy in myasthenia gravis*. Acta Anesthesiol Scand 2000; 44: 351-353.

- 5) Leventhal S R, Orkin F K, Hirsh R A. *Prediction of the need for post-operative mechanical ventilation in myasthenia gravis*. *Anesthesiology*, 1980, 53: 26-30.
- 6) Martin C, Auffray J P. *Il periodo preoperatorio del miastenico* E.C.M. Roma Anestesia-Rianimazione, 36657 C10, 6: 90-8.

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