

**Evaluation of the efficiency of the Noninvasive positive
Pressure ventilation in comparison to the conventional
Mechanical ventilation in management of acute
Respiratory failure**

Thesis submitted in partial fulfillment of the M.D.degree in anaesthesia

By

Ayman Ahmed El sayed Kasem
(MB.Bch-M.Sc. Ain Shams University)

Under supervision of

Professor Doctor / Salwa Mehanny Abdel Malak

Professor of Anaesthesia & Intensive Care
Faculty of Medicine, Ain Shams University

Professor Doctor / Alaa Eid Mohamed

Professor of Anaesthesia & Intensive Care
Faculty of Medicine, Ain Shams University

Doctor / Amr Esamel Din El-Hennami

Assistant professor of Anaesthesia & Intensive Care
Faculty of Medicine, Ain Shams University

Doctor / Mohamed Mohamed Nabil El-Shafei

Lecturer of Anaesthesia & Intensive Care
Faculty of Medicine, Ain Shams University

Faculty of Medicine
Ain Shams University
2005

List of Tables

No.	Table	Page
Table (1):	Causes of respiratory failure.	16
Table (2):	Pharmacologic agents for obstructive airway disease	26
Table (3):	Aminophylline maintenance infusion dosages.	27
Table (4):	Indications for mechanical ventilatory support	30
Table (5):	Recommendations for monitoring mechanical ventilatory support in the critically ill.	51
Table (6):	Complications of mechanical ventilation	52
Table (7):	Goals of noninvasive ventilation	62
Table (8):	Methodology for non-invasive positive-pressure ventilation in patients with acute respiratory failure(University of Tennessee, Memphis)	66
Table(9):	Criteria for selecting patients for NPPV	67
Table(10):	Contraindications of NPPV	68
Table(11):	Effects of continuous positive airway pressure (CPAP) and pressure support ventilation (PSV) delivered by a mask, alone and in combination, on gas exchange and transdiaphragmatic pressure, in patients with obstructive and restrictive lung disease.	69
Table(12):	Criteria to discontinue non-invasive positive pressure ventilation (NPPV).	79
Table(13):	Frequancy of adverse side effects and complications	82

	off NPPV with possible remedies	
Table(14):	summary of methodology	87
Table(15):	APACHE II SCORE	89
Table(16):	Causes of respiratory failure leading to entry into the study	91
Table(17):	Demographic and Physiological Parameters	93
Table(18):	Paco ₂ as a variable in both groups	94
Table(19):	PaO ₂ :fiO ₂ improvement in both groups	96
Table(20):	pH & paco ₂ improvement in patients with hypercarbia in the two groups	96
Table(21):	Survival rate and ICU stay	100
Table(22):	Complications and serious events resulting into death	100
Table(23):	Characteristics of patients according to success or failure in the NPPV group	103
Table(24):	ABG as a predictor of success of NPPV	104
Table(25):	Characteristics of patients according to success and failure in the conventional group	106

List of Figures

No.	Figure	Page
Figure (1):	Static pressure volume curve	5
Figure (2):	Static lung volumes and capacities	6
Figure (3):	Pressure volume curves during positive pressure breathing	31
Figure (4):	Airway pressure during respiratory cycle for positive pressure breathing	33
Figure (5):	Tidal transdiaphragmatic pressure (Pdi) swings	64
Figure (6):	Examples of different types of interfaces	71
Figure (7):	Application of NPPV	85
Figure (8):	The percentages of different causes of respiratory failure that lead to entry into the study and randomly assigned to each group	92
Figure (9):	Patients from the NPPV group who required ETI	95
Figure (10):	Respiratory rate improvement in NPPV group with time	97
Figure (11):	Kaplan Meier Survival analysis of the length of ICU stay	98
Figure (12):	Survival rate, complication, serious complication in both groups	99
Figure (13):	Comparison of incidence complications leading to death in both groups	101

Figure (14):	Age and APACHE II score in success and failed NPPV	104
Figure (15):	Duration of mechanical ventilation and ICU stay in both groups	105
Figure(16):	Age and APACHE II score in survived and died ETI	107
Figure(17):	Duration of mechanical ventilation and ICU stay in survived and died ETI	108

Introduction and Aim of the Work

Review of Literature

Subject and Methods

The Results

DISCUSSION

Conclusion

Summary

References

Arabic Summary

Acknowledgment

First, thanks are all due to **God** for blessing this work until it has reached its end, as a part of his generous help throughout my life.

Words can not express my deepest thanks gratitude to Prof. Dr. **Salwa Mehanny Abd-El-Malak**, professor of Anaesthesia and Intensive Care, Faculty of Medicine, Ain Shams University, for her great support and continuous encouragement throughout this whole work. It is a great honor to work under her guidance and supervision.

I am truly grateful to Prof. Dr. **Alaa Eid Mohamed**, professor of Anaesthesia and Intensive Care, Faculty of Medicine, Ain Shams University, for his close supervision, sincere help, valuable suggestions and continuous encouragement throughout the whole work.

My deepest appreciation and grateful thanks are due to Dr. **Amr Essamel-Din El-Hennami**, Assistant professor of Anaesthesia and Intensive Care, Faculty of Medicine, Ain Shams University, for his kind advise and his great efforts throughout this work.

My deepest gratitude goes to Dr. **Mohamed Nabil El-Shafie**, Lecturer of Anaesthesia and Intensive Care, Faculty of Medicine, Ain Shams University for his continuous support and faithful guidance.

Ayman Ahmed Kasem