



THE STUDY OF FORCED VITAL CAPACITY IN PATIENTS OF ASCITES

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ABSTRACT

Background: The study of forced vital capacity in patients of ascites. Huge ascites restricts the expansion of the lungs from the abdomen and hence decreases forced vital capacity. **Aim:** To assess the effect of ascites on vital capacity in patients with respiratory system impairment. **Setting And Design:** The study was planned to assess the effect of huge ascites on vital capacity in ascitic patients. **Methods And Materials:-** Seventy-five male ascitic patients free from cardiopulmonary diseases were taken for pulmonary function test, along with seventy-five normal subjects of the same age group as control. The pulmonary function test was done using the instrument "McKesson Vitalor," and the forced expiratory spiogram was taken from this forced vital capacity. The forced vital capacity was statistically analyzed by the Student's t-test, both paired and unpaired. **Results:** The present study shows a significant decrease in forced vital capacity in ascitic patients compared to control subjects. **Conclusion:** Huge ascites restricts lung expansion from the abdomen, leading to decreased forced vital capacity.

KEYWORDS : Forced Vital Capacity (FVC), Pulmonary Function Test (PFT), Vital Capacity, Ascites.

INTRODUCTION

It has been observed that abdominal distention due to ascites affects respiratory movements, impairing pump function of the respiratory apparatus. Later, this leads to pleural pressure changes and affects chest wall mechanics, ultimately decreasing vital capacity.

MATERIALS AND METHODS

The present study was undertaken at **S. R. T. R. Government Medical College, Ambajogai**, located in the Marathwada region of Maharashtra, India. It was conducted in the Department of Physiology and the Department of Medicine

The pulmonary function test was done using "McKesson Vitalor."

Age Group	No. of Subjects	Control (Mean $\pm$ SD)	Ascitic Patients (Mean $\pm$ SD)	Significance
21-30	15	3.27 $\pm$ 0.32	2.21 $\pm$ 0.29	p<0.05
31-40	20	3.39 $\pm$ 0.31	2.30 $\pm$ 0.28	p<0.05
41-50	20	3.45 $\pm$ 0.30	2.25 $\pm$ 0.30	p<0.05
51-60	20	3.50 $\pm$ 0.29	2.22 $\pm$ 0.27	p<0.05

Procedure:

- The subject was seated in an upright position.
- In front of the subject was an apparatus in which deep full inspiration and then forced expiration was performed.
- The best of three consecutive forced vital capacity tests was selected for evaluation.

Observation

The results were statistically analyzed by Student's t-test (paired and unpaired). The forced vital capacity comparison in control and ascitic patients is shown below:

Significance: The study found a significant decrease (p < 0.05) in forced vital capacity in ascitic patients compared to controls.

DISCUSSION

The study demonstrates that ascitic fluid occupying the abdominal space restricts diaphragmatic movements and

decreases lung expansion. This leads to a marked reduction in forced vital capacity, as seen in the study data.

According to Laplace's law, as intra-abdominal pressure rises, diaphragmatic movement is hindered, affecting pulmonary function. The biomechanics of the thoraco-abdomino-diaphragmatic respiratory pump deteriorate, reducing its efficiency.

SUMMARY AND CONCLUSION

- Seventy-five male ascitic patients free from cardiopulmonary diseases underwent pulmonary function tests.
- Their forced vital capacity was significantly reduced compared to the control group.
- This is due to the space-occupying nature of ascitic fluid, which prevents proper lung expansion and diaphragm function.

REFERENCES:

- Abelmann W.H., Frank N. R., Gaensler E.A., Cugell D. W. Effects of abdominal distention by ascites on lung volumes and ventilation. Arch. of Inte. Medd.: 93: 528-540, 1954.
- Cotes J. E. Lung functions assessment and application in medicine, 11th Ed., Blackwell Scientific Publication: P-18-20, 59-98, 326-329, 464, 1975.
- Derene J. P. H., MacKlem and Roussos C. H. The respiratory muscles, mechanics, control and pathophysiology. Am. Rev. Resp. Dis., state of arts article: Part III: 118: 581-595, 1978.
- Fenn W. O., Rahn H. Handbook of physiology: sec 3: Respiration: vol. 2, published by American Physiological Society, Washington O. C.: 1368, 1625, 1634, 1635, 1367, 1381, 1965.
- Goldman M. D., Mead J. Mechanical interaction between the diaphragm and ribcage. Jr. Appl. Physio.: 35:2: 197-204, 1973.
- Grimby, Goldman M. and Mead J. Respiratory muscle action inferred from ribcage and abdomen V.P partitioning: Jr. Appl. Physio. 41: 739, 1976.
- Hanson C. A., Ritter A. B., Duran W. and Lavites M. H. Pulmonary function in ascites: Am. Rev. Resp. Dis.: A-293, 1989.
- Mutoh T., Wayne J. E., Embree L. J., Hilderandt J. and Albert R. K. Abdominal distension alters l regional pleural pressure and chest wall mechanics in pigs in vivo: Jr. Appl. Physio.: 70 (6): 2612-2618, 1991.