Basilar Atelectasis as the True Predictor of Acute Abdomino-Pelvic Pathology—
A Two Year Retrospective Study of Patients Under the Age of 55 Evaluated with Multi-detector CT-Scan.

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Abstract—**The purpose of the study is to show the presence of basilar atelectasis in otherwise healthy young individuals who come to the ER, as the positive predictor of acute clinical presentations to an underlying abdomino-pelvic pathology. This study represents 289 retrospective charts/images reviewed from data obtained from ER and PACS database for all patients under 55 years from September 1, 2011 to August 31, 2013 who had a CT abdomen/pelvis ordered at the Larkin Community Hospital ER. The results obtained from this study suggest that a relative risk (RR) of 2.0 which is equivalent to 100% correlation exists in individuals who come to the ER with basilar atelectasis could have an underlying abdomino-pelvis pathology.**

Keywords—Abdomino-pelvic, Basilar Atelectasis, chart review, PACS

I. Introduction

Atelectasis literally means "incomplete expansion;" this term is used to describe any loss of lung volume that is appreciated as opacity of increased density on Computed Topography (CT) scan or plain Chest X-ray film (2). While atelectasis may be common among the elderly, it is uncommon to see atelectasis in healthy young and middle-aged adults. Current studies have shown increased incidence of atelectasis following cardiothoracic and abdominal surgery (3, 4). However, there are not many studies which evaluate atelectasis at the time of initial presentation to the ER at the time of clinical symptoms that predates surgical procedures. There is a single case report of recurrent atelectasis caused by colon cancer in Chile, as seen on ER chest X ray (5).

This is a unique case of an 83-year-old woman with a three year history of left hemicolectomy due to tubular colon adenocarcinoma. She presented to the ER for progressive dyspnea, cough and mucous sputum. On physical examination, there were no breath sounds on the left lung and also complete dullness on the left; on a chest X-ray it showed a complete opacity of the left lung. When the individual was treated for pneumonia and her left lung expanded again however in three weeks there was a relapse of her left lung atelectasis (5, 12).

In current literature, there are no studies that link basilar atelectasis to new onset abdomino-pelvic pathology ipsilaterally below the diaphragm. The purpose of this study is to show the presence of basilar atelectasis in an otherwise healthy young individual who comes to the ER can be used as a positive predictor of acute clinical presentation for an abdomino-pelvic pathology.
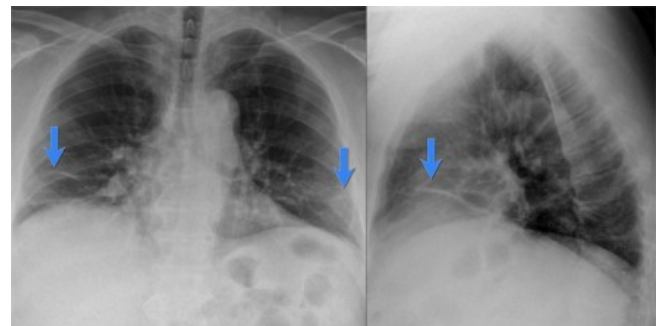

Fig. 1. Plate-like atelectasis post abdominal surgery (courtesy www.radiologyassistant.nl).

II. Methodology

A. Hypothesis/Null Hypothesis

Null Hypothesis: Presence of basilar atelectasis as seen in the CT scan is not a sufficiently accurate independent predictor for the presence of abdominopelvic pathology.

True Hypothesis: Presence of basilar atelectasis seen in the CT scan is a sufficiently accurate independent predictor for the presence of abdominopelvic pathology.

B. Methodology

This study represents a retrospective charts/images review obtained from the ER and PACS database for all patients under 55 years from September 1, 2011 to August 31, 2013 who had a CT of the abdomen/pelvis ordered by the ER. The sample size from September 1, 2011 to August 31, 2013 was 289 cases and their image reviews were reviewed after approval by the Institutional Review Board (IRB).

C. Inclusion Criteria

- Have clinical findings of presence of basilar atelectasis.

- Had at least one CT scan done at Larkin Hospital through ER during admission.

- Are between the ages of 18-55, both male and female.

- Patients whose pain rating scale value was documented by the ER and the presence of abdominopelvic pathology was documented in the ER.

D. Exclusion Criteria

- Had no CT scan done at Larkin Hospital through the ER during admission.

- Are below the age of 18.

- History of any type of cancer.

- Surgery within the last 6 months.

- Chronic lung diseases.

- Tobacco use greater than 1 pack per day within the last 12 months.

III. DATA COLLECTION AND STATISTICAL METHODS

CT images study represents a retrospective chart/images review obtained from the ER and PACS database for all patients under 55 years. A board-certified neuro-radiologist reviewed the images independently and generated a report. The patients from the ER who had CT imaging done also had a pain rating scale done in the ER for organic pathology collected. The initial data was organized using a Microsoft Excel spreadsheet. The statistical analysis was performed based on the classifications stated above in relation to the entire patient population, predicting the relative risk of possibility of a CT scan showing the presence of basilar atelectasis as a direct correlation with an underlying abdominal-pelvic pathology. A CT scan independently predicts the correlation between basilar atelectasis and abdominopelvis pathology more consistently than pain scale's correlation.

Atelectasis			
		+	-
Abdominopelvic Pathology	+	53	53
	-	46	137

Clinical Pain Rating			
		+	-
Abdominopelvic Pathology	+	71	31
	-	112	67

- 8 patients were not asked for pain rating by ER. They were omitted from calculation for Fig 2.

Fig. 2. A MRI image of the trigeminal nerve and surrounding anatomy. (Courtesy: GammaknifeImaging.com)
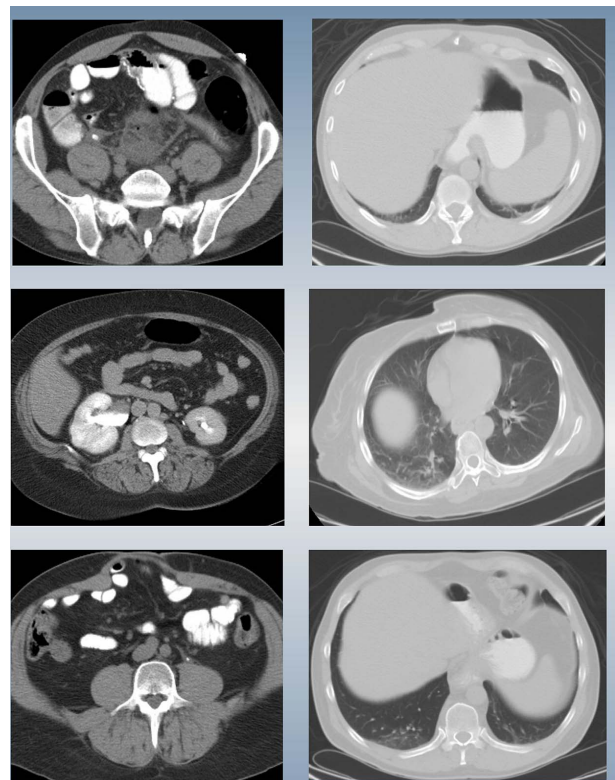
IV. STUDY RESULTS

Fig. 3. Axial view of CT scan of an individual with basilar atelectasis with an underlying abdominal-pelvic pathology on the ipsilateral side.

The results obtained from this study show that the relative risk (RR) of 2.0 which is equivalent to 100% correlates that the patients with basilar atelectasis had an abdomino-pelvis pathology. On the other hand, the RR associated with the pain rating scale was lower than 1.1. This data suggests that basilar atelectasis may be a better gauge of abdominal pathology than a pain rating scale. These findings are similar to the observations made in some previous studies.

V. Discussion

Post-operatively after an abdominal surgical operation, these individuals have a relatively higher risk to develop pulmonary complications. The lung function and the gaseous exchange in the alveoli are severely impacted due to effects of general anesthesia and the surgical procedure itself. Therefore, it is important for a complete pulmonary function evaluation to asses any risk factors for pulmonary complications before any surgery is warranted for abdominal pelvic pathology (1, 8).

Post-operative complications such as pneumonitis, atelectasis, bronchitis, pulmonary emboli and acute respiratory failure are seen commonly seen after abdominal surgery. The early predictors like preoperative respiratory symptoms and the spirometric parameter of forced expiratory volume in 1 second (FEV1) can be valuable risk predictors for post surgery complications. Also, studies have shown that treating the pulmonary symptoms before surgery has an overall better prognosis and faster recovery (4, 7).

Relative Risk	Change in Risk
2.5	150 percent increase in risk
2.25	125 percent increase in risk
2	**100 percent increase in risk or two times the risk**
1.75	75 percent increase in risk
1.5	50 percent increase in risk
1.25	25 percent increase in risk
1	Baseline
0.75	25 percent decrease in risk
0.5	50 percent decrease in risk or half the risk
0.25	75 percent decrease in risk

Fig. 4. Change in Risk

As shown in this study a relative risk (RR) of 2 in individuals who present with basilar atelectasis with an underlying abdomino-pelvis pathology; whereas RR associated with the pain rating scale was lower than 1.1. Currently, patients admitted in the ER are evaluated for abdominopelvic pathology are assessed by initial abdominal symptoms like pain, nausea, vomiting, etc. One of the instruments used in the ER is a pain scale which subjectively assesses the patient's severity of presentation. A simple CXR done in the ER can also greatly help as a predictor for abdomino-pelvic pathology. This data suggests that basilar atelectasis may be a better gauge of abdominal pathology than a pain rating scale.

VI. Conclusion

This study shows that an early review by a radiologist or a physician of a CXR followed by a review of a CT scan of the abdomen and pelvis in individuals with pulmonary symptoms and basilar atelectasis can effectively predict with certain accuracy an underlying organic abdomino-pelvic pathology.

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