Circumscribed Intrapulmonary Hematoma
Presenting as a "Coin" Lesion

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In recent years the problem of solitary circumscribed pulmonary nodules has attracted much attention in the medical literature. The difficulties involved in establishing an accurate diagnosis in cases of this kind are well recognized and are usually resolved by resort to exploratory thoracotomy and excision of the lesion. That this approach to the problem is rational and well founded is amply substantiated by the many excellent reviews on the subject which have established an incidence of malignancy in such cases varying from approximately 7 to 74 per cent and averaging about 37 per cent.1-9 The major portion of this group is, of course, comprised by primary bronchogenic carcinoma, while metastatic tumors and other primary malignant diseases such as bronchial adenoma, sarcoma or lymphoblastoma make up a much smaller component. Non-malignant lesions which most commonly present as isolated pulmonary nodules are tuberculomas, granulomas of nonspecific origin, hamartomas, histoplasmosas and coccidioidomas. In addition to the above disorders there is a great variety of less common and even rare conditions which may assume the form of "coin" lesions and with which the physician must be familiar if he is even to consider the correct diagnosis prior to surgical exploration of the chest. To but mention some of these diseases—chronic organized pneumonitis, lung abscess, bronchogenic cyst, pleural mesothelioma, lipoid granuloma, neurofibroma, pulmonary infarct, encapsulated pleural effusion or empyema, blastomycosis, cryptococcosis, hemangiom, hydatid cyst, fibrin body and brucellosis may all appear as solitary circumscribed pulmonary nodules.

The following report purports to add to this list another condition which hitherto has received but little attention, that is, intrapulmonary hematoma.

Persistent, circumscribed, intrapulmonary hematomas must be either extremely rare in occurrence or generally unrecognized if one can judge from the few cases which have appeared in the literature.

Although a number of authors10-13 have briefly described or referred to hematoma formation in the lung, the roentgenographic changes produced by these lesions have been variously indicated as "spindle shaped"10, 13 or "ill defined"11, 12 and have not presented the sharply circumscribed, round or oval appearance of the so-called "coin" lesion. Only the three cases reported by Salyer, Blake and Forsee14 and the single...
case mentioned by Condon\textsuperscript{15} fall into this category. To this group a fifth such case is added in the following report.

Case Report: G. C. H., a 60 year old white male cook, was admitted to the hospital on May 5, 1954, for the treatment of an inguinal hernia. A routine admission roentgenogram of the chest disclosed the presence of a sharply defined circular density in the right lower lung field and this lesion then became the object of major diagnostic interest. History disclosed that the patient had enjoyed relatively good health until December, 1949, when he developed the onset of sudden severe pain in the low back region. He was admitted to the hospital at that time, where roentgenograms of the skeletal system disclosed generalized demineralization associated with collapse of the first lumbar vertebra together with anterior wedging of several thoracic vertebrae. Roentgenographic examination of the chest disclosed a healing fracture of the anterior aspect of the right seventh rib but no evidence of a parenchymal lesion. A diagnosis of multiple compression fractures of the vertebrae due to senile osteoporosis was established and he was discharged in January, 1950, after satisfactory response to rest and the application of a back brace. In August, 1953, he fell and sustained a fracture of the right hip. He was treated at another hospital and apparently made an uneventful recovery. Thereafter he did well until February, 1954, when he developed a "cold" associated with nonproductive cough, fever and severe pain in the right posterior chest. Treatment at a local outpatient clinic resulted in prompt improvement, although the thoracic pain persisted for three weeks. An x-ray film of the chest on February 16, 1954, disclosed no abnormality other than "bilateral emphysema." In the latter part of March, 1954, he fell and struck the right side of his thorax. Soreness at the site of injury gradually subsided in approximately two weeks. During this period he complained of mild exertional dyspnea and noted an alleged decline in weight from 166 to 138 pounds, but he sought no further medical attention until the present admission when he entered the hospital for the aforementioned hernia repair.

Physical Examination: On admission to the hospital he appeared to be well developed and nourished. He was mentally alert and showed no evidence of acute illness. Temperature 98.0\textdegree, pulse 84, blood pressure 160/110. The thorax appeared to be narrowed and exhibited an increased anterior posterior diameter. Breath sounds were generally diminished in intensity and the percussion note was hyperresonant over both lung fields. Other physical findings included evidence of generalized arteriosclerosis, prostatic hypertrophy, bilateral varicosities of the lower extremities, prominent kyphosis of the dorsal spine and a reducible, indirect, left inguinal hernia.

Laboratory and X-ray Film Findings: Roentgenograms of the chest disclosed a sharply circumscribed rounded lesion in the lower lobe of the right lung (Figures 1, 2, and 3). The shadow measured $3.5 \times 4.0$ cm. in diameter and appeared to be homogeneous but of low density. Although the lesion apparently touched the pleura posteriorly it seemed to be entirely located within the lung parenchyma. The remainder of the lung fields showed evidence of emphysematous changes. Healing fractures of the right seventh posterior rib and the posterior portions of the left eighth and ninth ribs were noted. A complete bone survey disclosed marked generalized demineralization throughout the skeletal system. There had been some progression of the multiple vertebral compressions since previous films of December, 1949. An intravenous pyelogram, a gastrointestinal series and a barium enema were negative. Tuberculin skin test (PPD) gave a positive reaction while testing with coccidioidin and histoplasmin was negative. Sulkowitch's test disclosed no increase in urinary calcium. Serum calcium 10.5 mg. per cent, serum phosphorous 3.5 mg. per cent, alkaline phosphatase 6.0 Bodansky units, acid phosphatase 0.07 K. A. units. Sputum, blood count, urinalysis, liver function studies and stool examinations were negative.

Course in Hospital: When diagnostic studies failed to clarify the etiology of the pulmonary nodule, the right thorax was entered through the bed of the excised seventh rib on June 2, 1954. A "cystic" lesion,
Intraluminal intra (intrapulmonary) hematoma—

**Figure 1:** Frontal section—anteroposterior roentgenogram of the chest, showing a sharply outlined circular density in the right lower lung.

**Figure 2:** Right anterior-oblique roentgenogram of the chest, illustrating the discrete outlines and homogeneous character of the lesion.
the size of a "golf ball" was encountered in the posterior aspect of the right lower lobe. Approximately one third of the lesion protruded sub-pleurally, while the remainder was buried in the parenchyma of the lung. The specimen, removed by "snip" resection, consisted of fluctuant mass which, when opened, was found to be cystic and contained approximately 6 cc. of dark red blood with some irregular small clots. When the blood was washed away the lining of the cyst was white and finely granular with some red fibrin strands attached. The wall of the cyst was less than 1 mm. in thickness; it appeared dense and fibrous. Microscopic examination disclosed a well-organized cyst wall surrounded by compressed lung parenchyma externally. Fragments of fibrin and degenerating blood were attached to the inner cyst wall (Figure 4). The pathological diagnosis was hemorrhagic cyst, post-traumatic (organized pulmonary hematoma). Microscopic study of the resected rib disclosed osteoporosis and a healing fracture.

The postoperative course was uneventful. On June 29, 1954, a left inguinal hernioplasty was carried out and on October 5, 1954, he underwent transurethral resection of the prostate. On October 20, 1954, he was discharged from the hospital. He was last seen when rehospitalized following a fall which caused severe pain in the lower back. This com-

**FIGURE 4:** Photomicrograph of a section of the wall of the hematoma demonstrating its well-organized fibrotic character. Shreds of fibrin can be seen on the inner surface of the cyst while compressed lung tissue is visualized externally.
plaint responded to rest and the application of a lumbosacral corset. X ray films of the chest were unchanged and he was discharged on January 19, 1956.

Discussion

Results of trauma to the lung or pleura are usually easily recognized. A clear-cut history of injury, either penetrating or nonpenetrating, is almost always obtained and physical evidence of trauma is seen in the form of rib fractures or contusions of the chest wall. If these findings are further associated with the typical roentgenographic appearance of hemothorax, pneumothorax or pneumohemothorax, it is easy to ascertain that injury to the pleura has occurred.

Violence to the chest may also injure the pulmonary parenchyma without apparent evidence of pleural perforation. Roentgenographic findings are less characteristic, in such cases, but usually reflect the results of hemorrhage and edema within the lung substance. Areas of diffuse infiltration or consolidation are seen, sometimes associated with an atelectatic component resulting from intrabronchial bleeding. The nature of these findings is further clarified by their tendency toward prompt regression during a period of a week or more.

Where the intrapulmonary bleeding is localized and becomes sharply circumscribed into the form of a solitary hematoma the diagnosis becomes less certain, since this type of lesion may be clinically indistinguishable from a primary bronchogenic carcinoma or any other condition which can assume the appearance of a “coin” lesion. In spite of a history of trauma, the presence of rib fractures or evidence of other injury to the chest, the physician is now confronted by an indeterminate pulmonary lesion, the exact nature of which can be established only by resort to exploratory thoracotomy. This was the situation in the cases reported by Salyer et al\(^1\) and in the patient we described.

Since all of the sharply circumscribed intrapulmonary hematomas thus far reported have been surgically excised, little is known of their ultimate fate. In describing poorly defined hematomas of the lung secondary to blast or nonpenetrating injury McGrigor and Samuel\(^2\) state that resolution of the lesion may take as long as six to eight weeks. Blair\(^3\) indicates a similar course for hematomas of this type. In 1950 Welkind\(^4\) reported what was probably the first case of a sharply circumscribed pulmonary hematoma to appear in the medical literature. The lesion was described as “a tumor-like shadow consisting of two spindle masses which fused at their axillary ends.” Resolution gradually took place over a period of 13 months, leaving two persistent linear scars. The author felt it to be “inconceivable that a simple hematoma would take 13 months completely to resorb,” and postulated that the lesion was associated with an element of infarction or that it was possible “some sort of thick capsule formed around the clotted blood, retarding the resolution.” He closed his paper with the prediction that final solution of the problem would come only from postmortem studies of hematomas months or years after injury. In 1953 Salyer et al\(^5\)
provided such a solution when they removed three localized pulmonary
hematomas by surgical resection. Two of these lesions were described as
cystic cavities filled with clotted blood. Similar pathological changes were,
of course, encountered in our own case. As Welkind\textsuperscript{13} postulated, it is
undoubtedly the cyst formation which accounts for the persistent nature
of these lesions. Just how long a well organized encapsulated hematoma
might remain unchanged within the lung is still a matter for speculation.
Although our patient was observed for only one month prior to resection,
in two of Salyer's\textsuperscript{14} cases the lesions exhibited no tendency toward resolu-
tion over periods of eight and 12 weeks. In Salyer's\textsuperscript{14} third patient the
hematoma showed no change in size during a period of three and a half
months, but a bronchial communication developed and the cyst underwent
partial evacuation of its contents, leading the authors to speculate on
the dangers of chronic suppuration or frank abscess formation. This
complication indicates that at least some of these lesions may be regarded
as potentially dangerous to the patient. However, it seems likely that in
most instances the hematoma would exhibit gradual resolution, as in
Welkind's\textsuperscript{13} case, while in others it would persist for even longer periods,
eventually undergoing fibrosis or perhaps calcification.

**SUMMARY**

1. A case of solitary, sharply circumscribed, intrapulmonary hematoma
following non-penetrating injury of the chest is reported. The hematoma
presented as a “coin” lesion clinically indistinguishable from a peripheral
bronchogenic carcinoma or other conditions known to produce discrete
pulmonary nodules.

2. The shape, the sharp outline and the tendency of these lesions to
persist unchanged within the lung for long periods can apparently be
ascribed to the formation of a fibrotic cyst wall around the hematoma.

3. Pulmonary hematomas of this type appear to be distinctly rare, but
should be considered in the differential diagnosis of isolated discrete
nodules of the lung, particularly if there is a prior history of chest
trauma or evidence of rib fracture. Even though the nature of such a
lesion is suspected, exploratory thoracotomy will usually be required in
order to establish the correct diagnosis.

**RESUMEN**

1. Se relata un caso de un hematoma después de una herida no penetrante
de tórax, el que fue solitario, y bien circunscrito. Ese hematoma revistió
el aspecto de una lesión de las llamadas en “moneda,” clínicamente indistin-
tuable de un carcinoma bronquiogénico periférico o de otras afecciones
que se sabe producen nódulos discretos en el pulmón.

2. La forma, el contorno limitado y la tendencia de estas lesiones a per-
sistir sin cambios dentro del pulmón por largo tiempo, puede atribuirse a
la formación de una pared de quiste fibroso alrededor.

3. Estos hematomas son raros pero deben tenerse presentes en el diag-
nóstico diferencial de los nódulos asilados y discretos del pulmón especialmente si hay antecedente de trauma del tórax o fractura de costilla.

Aunque la naturaleza de estos se sospeche la toracotomía exploradora se requerirá para aclarar el diagnóstico.

RESUME

1. Les auteurs rapportent un cas d’hématome intrapulmonaire isolé, très circonscrit, faisant suite à un traumatisme non pénétrant de la poitrine. L'hématome se présentait comme une lésion en "pièce de monnaie," qui ne pouvait pas se différencier d’un cancer bronchique périphérique ou d’autres états connus pour produire des nodules pulmonaires discrets.

2. La forme, le tracé précis, la tendance de ces lésions à persister sans changement à l’intérieur du poumon pendant de longues périodes, peuvent apparemment être attribuées à la formation d’une paroi fibro-kystique autour de l’hématome.

3. Les hématomes pulmonaires de ce type semblent être rares, mais devraient être pris en considération dans le diagnostic différentiel des nodules discrets isolés du poumon, particulièrement s’il y a auparavant une histoire de traumatisme thoracique ou la preuve d’une fracture de côtes. Même quand on suspecte la nature d’une telle lésion, il sera généralement indiqué de pratiquer une thoracotomie exploratrice pour affirmer le véritable diagnostic.

ZUSAMMENFASSUNG


2. Die Gestalt, die scharfe Begrenzung und die Tendenz dieser Herde, unverändert in der Lunge für lange Zeiträume bestehen zu bleiben, kann augenscheinlich die Bildung einer fibrotischen Cystenwand um das Hämatom herum zugeschrieben werden.

3. Pulmonale Hämatoome dieses Types scheinen ausgeprochen selten zu sein; man muss sie jedoch in Erwägung ziehen bei der Differential-Diagnose isolierter diskreter Knotenbildungen der Lungen, besonders wenn in der Vorgeschichte ein Thorax-Trauma vorkommt, oder der Befund einer Rippenfraktur besteht. Aber selbst wenn man die Natur einer solchen Veränderung vermutet, wird eine diagnostische Thorakotomie für gewöhnlich notwendig sein, um eine genaue Diagnose sicher zu stellen.

REFERENCES