

A probationary essay on emphysema : submitted, ... to the examination of the Royal College of Surgeons of Edinburgh, ... / by James Russell, Junior. June 1823.

Contributors

Russell, James, 1801-1862.

Publication/Creation

Edinburgh : Printed by P. Neill, 1823.

Persistent URL

<https://wellcomecollection.org/works/my89g4sa>

License and attribution

This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.



Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>

A
PROBATIONARY
ESSAY
ON
EMPHYSEMA;

SUBMITTED,
BY THE AUTHORITY OF THE PRESIDENT AND HIS COUNCIL,
TO THE EXAMINATION OF THE
Royal College of Surgeons of Edinburgh,
WHEN CANDIDATE
FOR ADMISSION INTO THEIR BODY,
IN CONFORMITY TO THEIR REGULATIONS RESPECTING THE
ADMISSION OF ORDINARY FELLOWS,

BY
JAMES RUSSELL, JUNIOR.

JUNE 1823.

EDINBURGH:
PRINTED BY P. NEILL.

1823.

PROBATIONARY

ESSAY

EMPHYSIEMA;

SUGGESTED

BY THE ATTORNEY OF THE UNIVERSITY AND HIS COUNSEL,

TO THE UNIVERSITY OF THE

UNIVERSITY OF EDINBURGH

IN THE YEAR 1823

FOR ADMISSION INTO THE BODY

IN CONNECTION WITH THE STUDY OF MEDICINE

AND THE STUDY OF THE

THEORY OF THE

THEORY OF THE

THEORY OF THE

THEORY OF THE

THEORY OF THE

THEORY OF THE

THEORY OF THE

THEORY OF THE

THEORY OF THE

THEORY OF THE

THEORY OF THE

1823

REMARKS

ON

EMPHYSEMA.

THE term *Emphysema* has been used to signify any tumor occasioned by the presence of air, without reference to the source from which the air was derived, or the manner of its formation. From which circumstance, affections are comprehended under the same name, which have nothing in common but the air by which the distension is produced. A great obstacle is thus thrown in the way of any one who wishes to give at once a concise and comprehensive view of Emphysema. For, while its most common form is simple in the manner of its formation, and, when attentively considered, involves subjects of

much practical importance, other rare forms occasionally present themselves, the origin of which is involved in great uncertainty, and which ought rather to be considered as medical curiosities, than as the probable subjects of practice.

Under the latter class, we would include those local collections of air which could not have been derived from without, and which do not always originate from the generation of air by putrefaction. RIVERINUS, ZACUTUS LUSITANEUS, FORRESTUS, FABRICIUS HILDANUS, BROWN, BECKETT, WISEMAN, LE CAT, TURNER, J. HUNTER, &c. mention cases of this kind, besides examples detailed in the *Ephemerid. Nat. Curios.* and other medical records, in some of which cases, the Emphysema occurred under the form of an encysted tumor. There are, in short, few parts of the body in which air has not at one time or another been found collected. Dr MONRO *, in opening the body of a patient who died after castration, found “ the mesentery inflated with air to a prodigious bulk, as were all the other cellular parts of the abdomen ; all the veins, large and small, were in the same condition ; the auricles and ventricles of the heart were greatly distended, and collapsed with a great blast of air when cut.” As some ounces of pus were likewise found in the cellular membrane, it is very possible, that,

* Edinburgh Medical Essays, vol. v. p. 275.

in this case, putrefaction might have had some share in giving rise to the Emphysema; and from WILMER's case of extensive general Emphysema, occasioned by a putrid foetus *in utero*, it appears, that the air escaping from the situations in which it is generated by putrefaction, may find its way to parts with which these have no direct communication. Whether the Emphysema assume the form of a local or general affection, will depend upon the circumstance of the air being collected in a shut cavity, or escaping into a part where it is not circumscribed; for if it once insinuates itself into the cellular membrane, it will encounter little resistance to its extensive diffusion.

Some cases of general Emphysema are recorded by Drs HUXHAM, SICKEL, and BAILLIE; the existence of which, Dr BAILLIE is disposed to agree with Mr J. HUNTER in referring to a secretion of air from the arteries. This hypothesis is ingeniously maintained; but still the subject is involved in great difficulties, unless we concur with Mr BURNS in believing, that the Emphysema in these and in some other cases had been dependent on a rupture of some of the bronchial cells.....

When Emphysema, as occasionally happens, is suddenly produced during violent exertions of the respiratory organs, its existence is to be traced to a rupture of some of the vesicles by which the air they contain enters the cellular membrane of the lungs, and is rapidly diffused, from the connexion which exists between the cel-

lular texture of the lungs and that of the rest of the body. Violent efforts made to retain the breath during child-birth, coughing, screaming, a foreign body in the larynx, have all been productive of this accident. Though calculated to alarm, from its sudden appearance, from the rapidity of its increase, and from the great disfiguration which it occasions, it is seldom hurtful, except in as far as respiration is impeded by the pressure which it exerts on the parietes of the chest.

It sometimes happens, that the air which escaped from injured vesicles, is diffused through the lung, without extending farther, producing proper Emphysema of the lung. This affection greatly impedes respiration, by the resistance which it offers to the expansion of the lung, although it does not appear otherwise to be of a malignant nature. When, however, it proceeds to such an extent as not only to impede the action of the affected lung, but, by its pressure on the mediastinum, to interrupt the play of the sound lung, it becomes seriously alarming. Emphysema of the lung may thus prove fatal, before the practitioner is aware of its existence; and even when he suspects this accident to have happened, he can do little either to remove or alleviate its effects. All the symptoms which are said to indicate this affection are equivocal; and in opening the body it may escape detection, even when it exists to a considerable extent.

Emphysema of the lungs has been found so complete

as to displace the heart, and even to distort the bony parietes of the affected side. In dissecting the bodies of those to whom this accident had happened, the lungs have protruded to a great extent from the thorax, as soon as it was laid open; and STORK mentions a case, in which the inflation of the lung was so complete, that it bounded from the floor like a football.

Emphysema is mentioned by MR WHITE as an occasional consequence of contused wounds about the head, face, eye-lids, and scrotum: it has likewise been observed in the axilla, after dislocation of the humerus. In a case that occurred to PETIT, Emphysema followed the infliction of a wound with a pointed stick, penetrating between the scapula and the ribs, but not entering the thorax. A similar effect has been observed from a musket-ball glancing along the convex surface of a rib, under the skin, and in wounds of the axilla. A case of Emphysema is described by M. MOREL, arising in consequence of a wound in the pharynx occasioned by a foil, thrust with violence through the nostril. In this case, the air collected in such quantity along the neck and throat, as greatly to oppress respiration, and to render deglutition extremely painful.

Artificial Emphysema has sometimes been produced in frolic, or for fraudulent purposes, by introducing a blowpipe under the skin, and forcibly distending it. FABRICIUS HILDANUS, DIONIS, AMBROSE PARE, and

SAUVAGE, mention cases of this kind, which have suggested the idea of employing inflation as a mode of administering remedies in the gaseous form.

There is another variety of Emphysema, of more rare if not of doubtful occurrence,—that which is induced by taking unwholesome food, by the bite of some insects, and the sting of some plants.

Dr W. HUNTER has favoured us with some very interesting observations on a form of Emphysema nearly allied to this, which accompanied a very destructive epidemical distemper among black cattle in the neighbourhood of London.

As the lungs are the only organs which freely admit air, so it rarely happens that emphysematous tumors are connected with other organs. LLOYD mentions a case of flatulent tumor under the scalp, communicating with the ear; and Emphysema of the abdomen has arisen from an accumulation of gas within the intestines, to such an extent as to rupture some part of their coats, probably weakened by previous disease.

Emphysema from an orifice in the lungs, may be the result either of an external injury, or of a diseased action.

The most frequent cause of Traumatic Emphysema, which, in a great majority of cases, is the form under which this affection occurs, is the injury inflicted on the lungs by the spiculæ of a fractured rib: it is also occa-

sionally produced from small sword, bayonet, and gunshot wounds. As very extensive fracture of the rib takes place without any division of the skin, the lung may be wounded, and permit the escape of part of the air which it contains, while no external opening exists, by which the effused air can be expelled. The laceration of the pleura costales, however, which necessarily accompanies a wound of the lung from this cause, permits the air to insinuate itself into the subcutaneous cellular membrane, through which, by the communication of the cells with one another, it may be diffused to an unlimited extent. For, as at each inspiration air will escape into the cavity of the chest, while the succeeding expiration will force it into the cellular membrane, the Emphysema must extend so long as the lung continues to act. We accordingly find cases recorded, in which the whole body has been prodigiously inflated. The elevation of the integuments is most remarkable in those parts of the body in which the cellular membrane is abundant, loosely connected, and not loaded with fat, as in the scrotum, axilla, and eye-lids.

The extent to which Emphysema will take place, is in some measure regulated by the size of the wound inflicted on the lung. When a wound of no great depth or extent is received, the ecchymosis and swelling which follow rapidly, close it up, and the wound heals, without permitting the escape of air, except on the first re-

ception of the injury. So that in opening the bodies of those who have died affected with traumatic Emphysema, the lungs have been found capable of full inflation, while the strictest examination could not discover the traces of a wound. Emphysema will seldom occur in consequence of a large wound of the lung, inflicted from without; not only because any instrument capable of producing an extensive wound on the lung, would make an opening in the parietes of the chest, sufficiently large to allow the escape of any air from the thorax, but likewise because the lung, when extensively wounded, will collapse, become loaded with blood, and no longer transmit any air. A wound of an intermediate size, places the lung under circumstances most favourable for the speedy production and rapid diffusion of emphysematous swelling.

The air which first escapes is confined to the subcutaneous cellular membrane, which offers least resistance to its diffusion, but afterwards extends to that which is intermuscular, and has even been observed to spread itself through the cellular texture situated under the tunica conjunctiva.

The puffy nature of the tumor, the rapidity of its increase, the crackling which takes place under the pressure of the finger, and the celerity with which it regains its form when the pressure is removed, for the most part sufficiently distinguishes Emphysema from every other

swelling. When the inflation has proceeded to such an extent as to render the skin very tense, or when it is complicated with anasarca, the diagnosis becomes more difficult. Emphysematous crackling has been mistaken for the crepitus arising from a fractured rib; and in a case which occurred to DESAULT, that celebrated surgeon had great difficulty in distinguishing it from false aneurism.

Traumatic Emphysema, though of a very alarming appearance, from the frightful disfiguration it produces, and distressing by impeding motion, and from the sense of weight which it occasions, is not of itself a dangerous affection, unless it proceeds to a very great extent. It is to be feared, rather as a symptom indicating the extent of injury which gives rise to it, and on account of the effects by which it is often accompanied, than from any bad consequences which of itself it is likely to induce. The concomitant effects of an injury producing Emphysema, which we have most reason to dread, are hæmorrhage, and oppressed breathing.

The appearance of Hæmoptysis, as a concomitant of Emphysema, is always alarming; but to enter into the consideration of this, or of any other form of hæmorrhage from the lungs, were foreign to the object of this paper.

Respiration may be oppressed, from the air admitted by the external wound causing the collapse of the lung.

Frequent dissections have indeed established it as an indisputable fact, that life has been perfectly maintained by one lung, when the other was almost removed by disease. Between the two cases, however, there is a marked difference; in the one, a provision has been gradually made for the declining usefulness of the diseased lung; while in the other, a sudden demand is made upon the sound lung to perform double its usual exertion. And although it be able to answer this demand, respiration will necessarily be laborious, hurried and painful. But the oppressed breathing to which I principally alluded, is that which arises from an accumulation of effused air in the cavity of the thorax. In every case in which Emphysema occurs in the cellular membrane, in consequence of a wound, air must first escape into the cavity of the chest, except when close adhesions have been formed between the two pleuræ. To the accumulation of air in this situation, there is no limit, until the effused air is in a state of greater condensation than that within the lung, or as to be able completely to fill the thoracic cavity, when enlarged during the act of inspiration. The effects produced by the sudden admission of air into the thorax, are well illustrated by a case related by M. RICHERAND. During the excision of a portion of two of the ribs, with the corresponding pleura, whenever the air was admitted into the cavity, the patient was threatened with instant suffocation; a compress and bandage were

immediately applied, but extreme difficulty of breathing remained for twelve hours. And though the gradual admission and accumulation of air in the thorax would be probably productive of much less violent symptoms; yet the natural tendency of air in such a situation will be to impede the action of the lung, and gradually to cause its collapse. The pressure exerted on the mediastinum by the elasticity of the effused air, will greatly impede the play of the sound lung, while the dyspnœa thus produced will be augmented by the depression of the diaphragm, which takes place from the same cause.

Besides those patients who fall a sacrifice to dyspnœa, which is the most common bad consequence of Emphysema, other dangerous and unexpected effects sometimes present themselves.

Among the most remarkable of these, I may mention those cases which have been observed to terminate fatally, from the air finding its way into the sanguiferous system. This appearance has been detected principally in the veins, as the escape of the globules of air occasioned an interruption to the flow of blood during venæsection. This accident proves fatal, when the air within the heart has accumulated in such quantity as completely to obstruct the circulation of the blood. So speedy and certain is the destruction of life from this cause, that the inflation of the jugular vein has been lately introduced into practice among farriers, as the most eligible method of putting horses to death.

In the treatment of traumatic Emphysema, our attention must first be directed to guard against the inflammation which will supervene upon any injury sufficient to produce Emphysema, and to obviate it by copious and repeated bloodletting. As an unusual proportion of blood will circulate through the sound lung, the danger of effusion will be more imminent, and our measures must be proportionally active and decided.

The wound entering the thorax has sometimes been dilated, in order to liberate the confined air; and where there was no external wound, incisions have been made to effect the same purpose. The great and immediate relief which has occasionally followed the adoption of this practice, is highly encouraging; while the favourable disposition manifested by these incisions to heal readily, leads us to regret that this operation has not been more frequently attempted. The seat of the injury will indicate the proper place for performing the operation; and it must be conducted in the same manner as Paracentesis thoracis for the evacuation of pus in empyema, or of water in hydrothorax.

Besides making an opening, some authors have recommended the use of a syringe, to endeavour to exhaust the effused air.

The employment of a compress and bandage, where they can be borne, is very useful: it prevents the pain and irritation which arise from the irregular edge of a

fractured rib, and, by giving support to the ribs, allows a degree of rest to the injured parts.

By impeding the entrance of air into the cellular membrane, however, it may cause an accumulation of air in the chest; and dyspnœa is sometimes so great, that a bandage cannot be suffered to remain. In the application of a bandage, we must be regulated by the feelings of the patient, tightening or relaxing it as the state of his respiration may require.

Various stimulating and anodyne embrocations have been employed, with a view to relieve the pain and irritation of the skin from distension; but the evacuation or removal of the effused air can alone afford permanent relief. When no addition is made to the quantity of air in the cellular membrane, by the escape of fresh portions from the thorax, a removal of it by absorption takes place sometimes with great rapidity. Electricity has found of advantage in exciting this natural action, which is sufficient of itself to effect a cure when the Emphysema is not very extensive. When the inflation has proceeded far, great distress is occasioned, which it will be necessary to relieve, by making scarifications. A puncture above the seat of the injury prevents the accumulation of more air, and relieves the neighbouring parts; but when the Emphysema is extensively diffused, it will be advisable to make punctures in different parts, selecting those which are most distended. When there

is a division of the integuments, which, from its obliquity, or the smallness of the orifice, is not sufficient to allow the air to escape, it must be enlarged, so as to afford the air a free passage.

Emphysema may be produced, independently of any mechanical injury, by the escape of air from the lungs, in consequence of disease in these organs. From the great loss of substance which the lungs frequently suffer from disease, we might expect the frequent escape of air into the cavity of the thorax; and probably this event would frequently occur, were it not prevented by the adhesions formed between the two pleura, during the inflammatory action which precedes such extensive functional derangement. Dr KELLY * gives a very striking example of Emphysema arising from this cause. A similar case occurred to Dr HAMILTON in the Royal Infirmary. PALFIN and MECKEL have likewise observed the same accident. The air thus effused, when confined to the cavity of the thorax, will probably escape detection, and greatly oppress breathing, or even prove fatal, while its existence remains unknown. And even when there is external Emphysema, while the symptoms lead us to infer the presence of a collection of air in the thorax, the evacuation of which is required to give relief, the practitioner has no means of ascertaining on which

* Edin. Med. Comment. vol. ii. p. 427.

side of the cavity the accumulation has taken place. An attentive consideration of the previous seat of pain, and of the spot where the swelling was first observed, may afford some assistance; but very great circumspection is required, where there are so few data to direct him, and where a mistake is attended with imminent danger.



FINIS.

side of the cavity the accumulation has taken place. An alternative explanation of the position of the fluid at the end of the spot where the swelling was first observed may afford some assistance; but very great caution is required, where there are so few data to direct him, and where a mistake is attended with imminent danger.

FINIS.







