



Physical Examination Signs of Inspection and Medical Eponyms in Pericarditis Part I: 1761 to 1852

Fan Ye¹ , Halil Tekiner² , Eileen S Yale³ , Joseph J Mazza⁴ , Steven Yale⁵

ABSTRACT

The history of pericarditis involves the recognition of signs and symptoms detected using the physical examination skills such as inspection, palpation, percussion, and auscultation. *Pericarditis* is the term used to describe the spectrum of diseases that includes acute, subacute, and chronic forms. From 1761 to 1852, physicians were required to use their sense of sight, identifying abnormalities recognized as the signs of medical eponyms attributed to honor their findings. In this first part of a three-part series on pericarditis, the signs detected through inspection are described. Through inspection, physicians identified the bulging or retraction of the precordium and epigastrium in patients with pericardial effusion or adherent pericarditis. Many of these signs were detected, described, and reported in patients with advanced or chronic adherent pericarditis. It is unknown how useful these signs are in modern-day clinical practice.

Keywords: Pericarditis, eponyms, physical examination, history of medicine

Cite this article as:
Ye F, Tekiner H, Yale ES, Mazza JJ, Yale S. Physical Examination Signs of Inspection and Medical Eponyms in Pericarditis Part I: 1761 to 1852. Erciyes Med J 2019; 41(2): 223-9.

INTRODUCTION

The word *pericardium* was first named by Galen of Pergamon (c.130–210 AD), and it is derived from the Greek preposition *peri* (about or around), and the word *kardia* (heart) (1). Pericarditis originated from the Greek suffix *-itis*, a simple adjectival ending and later the genitive form of the adjective to mean inflammation of the named organ (1). Pericarditis consists of an acute, recurrent (relapsing), chronic, adherent, and constrictive forms. During this time period, physicians, if they were to excel in the art of clinical medicine, were required to develop proficiency in diagnosis using the senses of sight, touch, and hearing, which respectively involved the application of inspection, palpation, and percussion, and auscultation. From these investigations, they identified and reported signs, which thereafter have been eponymously ascribed to their namesake.

The word *inspection* is derived from the Old French *inspeccion*, Latin *inspectionem* (a looking into), and the pie root *spek* (to observe) (2). Inspection is the first of the four basic tenets of the physical examination along with palpation, percussion, and auscultation, and it involves looking or observing. Covered in this review are eponymic signs of inspection of the precordium seen in patients with pericarditis. In patients with acute or chronic pericarditis, this involves observing the arterial and jugular venous pulse and shape as well as the strength and contour of chest and abdominal wall for bulging or retraction. Knowledge of these sign enhances understanding of the pathophysiology of disease and provides a window into the world of the bedside examination required prior to the advent of sophisticated diagnostic tests. These findings, depicted as medical eponyms, may impart important clues for diagnosticians to identify the underlying condition and explain the pathophysiological mechanism of the disease process.

Our goal in this series of papers on pericardial eponyms of inspection is to provide the reader with a unique and novel perspective and appreciation of the signs of pericarditis by first providing a synopsis of the physician who observed the sign; the sign as originally described; and if available, the sensitivity, specificity, and predictive value of the sign and its application in more modern-day clinical practice. The signs are presented chronologically based on the year that they were first reported (Table 1).

METHODS

PubMed, Medline, online Internet word searches, and bibliographies from the source text and textbooks sources were used. PubMed was searched using the Medical Subject Heading of the name of the eponym and text words associated with the sign.

¹Graduate Medical Education, University of Central Florida College of Medicine Orlando, FL, USA

²Department of the History of Pharmacy and Ethics, Erciyes University School of Pharmacy, Kayseri, Turkey

³Department of General Internal Medicine, University of Florida, Gainesville, Florida, USA

⁴Marshfield Clinic Research Institute, Marshfield, WI, USA

⁵Department of Internal Medicine, University of Central Florida College of Medicine, Orlando, FL, USA

Submitted
12.02.2019

Accepted
21.03.2019

Available Online Date
09.04.2019

Correspondence

Steven Yale,
University of Central Florida
College of Medicine 6850
Lake Nona Blvd, Orlando, FL
32827, USA
Phone: (407) 266-1000
e.mail:
steven.yale.md@gmail.com

Table 1. Inspection and pericardial eponyms signs (1761-1852)

Name	Year	Description of sign	Significance
Auenbrugger	1761	Swelling or bulging of the epigastrium.	Pericardial Effusion
Heim-Kreysig	1816	During systole, elevation of the chest wall and simultaneous depression of the left ribs.	Adherent Pericardium
Sander	1823	During ventricular contraction, the apex rises forward toward the fifth rib and depression at the left ribs at the superior abdominal region. This represents a perpetual movement being of a strong undulating cardiac impulse, most prominent in the epigastrium. During inspiration, the hollow is deeper, but the shock weaker with the converse occurring during expiration.	Adherent Pericardium
Hope	1839	Systolic protrusion and retraction of the precordial region	Adherent Pericardium
Williams	1840	Protrusion of the chest wall involving the cartilage of the middle ribs along with a retraction or depression of the epigastrium	Adherent Pericardium
Bouillaud	1846	Depression of the precordial region	Adherent Pericardium
Škoda	1852	Systolic retraction and diastolic elevation occurring at the lower half of the sternum	Adherent Pericardium

Auenbrugger Sign

Joseph Leopold Edler von Auenbrugger (1722-1809) was born in Graz, Styria, Austria, and studied medicine at the University of Vienna (3). In 1751, he served at the Spanish Military Hospital in Vienna, initially as an assistant and subsequently as a physician (3). It was in 1754 that Auenbrugger noted differences in sounds by striking the chest wall (3). He published his observation, methods, and results of percussion in his book titled *Inventum Novum Ex Percussione Thoracis Humani, Ut Signo Abstrusos Interni Pectoris Morbos Detegendi* ("A New Discovery That Enables the Physician From the Percussion of the Human Thorax to Detect the Diseases Hidden Within the Chest") (4). It is of historical interest that this finding was initially dismissed and later reviewed by Jean-Nicolas Corvisart (1755-1821), a French physician who embraced this technique (3).

In 1761, Auenbrugger described under the twelve observations of dropsy of the chest in his aforementioned book, subheading XLVI, "Dropsy of the Pericardium," his observation of two signs that bear his namesake:

A swelling is perceived in the praecordia, which can readily be distinguished by its superior resistance, from the stomach distended by flatus. (4, p. 401; emphasis added)

Thus, this sign refers to significant protuberation of the epigastrium in massive pericardial effusion (5). He also described his observation of a flat percussion sound on the chest in cases of pericardial effusion:

The sound in the cardiac region, which I have already stated (III. 2.3.) to be naturally more obscure than in the other parts of the chest is now as completely deadened as if the percussion were applied to a fleshy limb (4, p. 401; emphasis added)

This eponym, also named the Auenbrugger sign, refers to the presence of dullness in Traube's space due to a large pericardial effusion caused by the descent of the left lobe of the liver (Table 1) (6). We are not aware of any studies that evaluated the sensitivity or specificity of this sign.

Heim-Kreysig Sign

Ernst Ludwig Heim (1747-1834) was born in Solz, Thuringia, received his doctorate in 1776 at Halle, and conducted his medical studies at Jena and Leipzig (7-9). In 1776, he served at Spandau as a government physician of the Havel district and in 1778 for the region Osthavelland (8,10). In 1780, he moved to Berlin, achieving the rank of a professor at the university and in 1806 served as senior physician to the Armendirektorium (8). In 1822, he was recognized for his service by the city of Berlin, being named an honorary citizen (8). He was also the recipient of the Knight of the Red Eagle Order of the Third Class by the King of Prussia and of the Nordstern Order by the King of Sweden (11). In addition to his advocacy in promoting public health, he was also a botanist with a special interest in mosses (7).

Friedrich Ludwig Kreysig (1770-1839) was born in Eilenburg and received his habilitation (medical doctorate) in 1795 at the University of Leipzig (12, 13). In 1801, he was appointed professor of anatomy and botany in Wittenberg and in 1815 professor of special pathology and therapy at Medical-Surgical Academy, and Director of the Medical Clinic (13-15). He served as a foreign member of the Royal Swedish Academy of Sciences in 1828 (13). His interests were in the areas of botany and diseases of the heart. As such, he was a founding member of the Society for Nature and Medicine and a member of the Society of German Scientists and Physicians, Dresden (16). In addition to the sign which he described with Heim he was also influential in describing the inflammatory process in endocarditis (13).

In 1816, Friedrich Ludwig Kreysig described in his paper titled “Die Krankheiten des Herzens” (“The Diseases of the Heart”) a visible and palpatory finding in cases of adherent pericardium:

For there is a violent pounding in the breast, partly persistent and partly periodic. Instead of what the writers call palpitations; this knock is outwardly visible, often audible, not infrequently with a hissing sound at each systole... [b]ut is also distinguished by visible changes in the thorax, if one exposes it, as well as by feeling and placing the flat hand on the lowest part of the breast in the area of the corresponding diaphragm. In fact, in this latter attempt, especially if the patient is allowed to move back and forth around the room a few times, the hand gets a violent shock or a feeling as if it were torn violently from the corresponding diaphragm. *If one looks at the thorax, one sees that it is not only violently shaken by every systole of the heart, and, as it were, is raised upwards, but at the same time one always notices a deepening under the ribs of the left side, as it were, a hole in it. The discovery of this latter circumstance and sign I owe to the keen insight of the experienced Privy Councilor, Dr. Heim in Berlin.* (17, p. 623; emphasis added).

Thus, the Heim–Kreysig sign refers to the concavity present during cardiac systole caused by depression of the chest wall in patients with adherent pericarditis (Table 1). We are unaware of any studies that evaluated the sensitivity and specificity of this sign.

Sander Sign

James Sander (1777–1843), father of another well-known physician, William Rutherford Sander, was an English physician who practiced in Edinburgh. James Sander was involved in the early study of digitalis (18). He was a member of the Medical Society of Edinburgh and served as a president of the Royal Medical and Royal Physical Societies of Edinburgh (19, 20). Sander reported that in the adherent pericardium:

During the simultaneous contraction of the ventricles, the heart becomes shorter, rounder on its surface, it narrows to expel the blood. Its apex rises forward toward the fifth rib, causing the lower part of the pericardium to rise with the diaphragm and all that is adherent to it. At the same time a depression under the left ribs of the superior abdominal region is obstructed. In the following moment, during the simultaneous contraction of the two auricles, the ventricles relax, dilates to receive the blood, the apex of the heart moves suddenly downwards, and, not having a free space to move in, communicates to the adherent pericardium, the diaphragm, and to the other parts, the shock, which becomes sensible to the exterior by a small elevation which is outlined in the same place where the depression had formerly been formed, and which nevertheless extends a little lower down. Strictly speaking, the depression precedes the shock, since the contraction of the auricles is the beginning of the action of the heart. It is a

perpetual movement of a very strong undulation, being lower than that which is felt naturally in the region of the heart. Thus during inspiration and expiration, the two phenomena are separated in each moment from the contractions of the auricles and the ventricles; they are united during a single pulsation of the radial artery; the collapse of this one is isochronous with the pulsation under the ribs, and the arterial pulsation with the sagging. During inspiration the hollow is deeper since the heart opposes the change of its situation with more force, consequently entailing lowering a greater part of the diaphragm. One will note moreover, that the shock is less strong since the adhering parts having moved further away transmit less of the descending movement of the heart to the outside, and visa versa, during expiration. (21, pp. 156–157; emphasis added).

Sander believed that he identified a

[m]echanical sign, always produced by the same and unique cause, a sign which will never deceive, which will enable us to very easily recognize the adhesion of the pericardium, even when it is complicated with other diseases of the heart or chest. (21, p. 157).

Laënnec wrote in his book *Traité de l'auscultation médiate et des maladies des poumons et du cœur* (“Treatise of the Diseases of the Chest and of Mediate Auscultation”):

I have understood than an English physician, Dr. Sander, has announced as an infallible sign of the adhesion of the pericardium to the heart, the existence of a hollow, during each systole of the organ, in the epigastrium, immediately below the left false ribs. (22, pp. 677–678)

Thus, the Sander sign refers to the presence of a depression occurring under the left ribs in the superior abdominal region and in the epigastrium during systole in patients with adherent pericardium (Table 1). We are unaware of any study that evaluated the sensitivity or specificity of this sign.

Hope Sign

James Hope (1801–1841) was born in Stockport, England and received his medical degree from Edinburgh University in 1825 (23). In 1828 he obtained the College of Physician degree as a licentiate and in 1831 served as physician to the Marylebone Infirmary (23).

He published the first (English) edition of his critically acclaimed book *A Treatise on the Diseases of the Heart and Great Vessels* in 1831, which described his work on heart sounds and murmurs (24–26). That same year, he was elected fellow of the Royal Society (27). He published another influential book in 1833 titled *Principles and Illustrations of Morbid Anatomy adapted to the Elements of M Andral and to the Cyclopaedia of Practical Medicine Being a Complete Series of Lithographic Drawings, from Originals by the Author: with Description and Summary Allusions to Cases, Symptoms, Treatment, & c.* (28, 29). In 1839, he was appointed full physician at St. George’s Hospital and in 1840 fellow of the London College of Physicians. James’ father, Thomas Hope, pro-

vided him with the following words of wisdom that were forever beholden to him:

First, never keep a patient ill longer than you can possibly help. Secondly, never take a fee to which you do not feel yourself to be justly entitled. And thirdly, always, pray for your patients. A short time before his death, Dr. Hope said that these maxims had been the rule of his conduct, and that he could testify to their success (30, p. 51).

James Hope in his book titled *A Treatise on the Diseases of the Heart and Great Vessels* described two signs he believed to be important to support the diagnosis of adherent pericardium in rheumatic heart disease:

- (1) *[t]he heart, though enlarged, and when, therefore, it ought to beat preternaturally low down in the chest, beats as high up as natural, and sometimes occasions a prominence of the cartilages of the left precordial ribs... We should, indeed, naturally expect that the adhesion would brace up the organ, and that, when enlarged and not able to descend, it must, being bounded behind by the spine, force the walls of the precordial region forward.*
- (2) *[a]brupt, jogging, or tumbling motion of the heart, very perceptible in the precordial region with the cylinder. It is more distinct when the heart is hypertrophous and dilated; and, under these circumstances, I have found the jogs correspond with the ventricular systole and diastole respectively, that of the diastole being sometimes nearly as strong as the other, and having the character of a receding motion suddenly arrested... This jogging motion is distinguished from the undulatory movement of fluid in the pericardium, both by its nature, by the exact synchronism of the jogs with the sounds, and by the feeling that the heart, at each systole, comes in immediate contact with the thoracic walls. I suppose the double jog to be occasioned by the heart being bound down to the spine by the adhesion, whence it is tilted forwards as often as the rounded swell of the ventricles, both during their systole and their diastole, meets the resistance of the spinal column. The jogs would, of course, be increased by hypertrophy, and also by aortic regurgitation, which imparts abruptness to heart's action. (31, p. 194; emphasis added)*

Thus, the Hope sign refers to the systolic protrusion and retraction of the anterior chest wall in patients with pericardial adhesions (Table 1) (32). We are unaware of any studies that evaluated the sensitivity or specificity of this sign.

Williams Sign

Charles James Blasius Williams (1805-1889) was born in the Hungerford Almshouse, Wiltshire, and received his medical degree from the University of Edinburgh in 1824 (33). In 1830, he practiced medicine at St. George's University, London (34). He was elected fellow of the Royal Society in 1835 and fellow of the Royal College of Physicians in 1840. In the Royal College, he also served

other eminent titles including Guoulstonian Lecturer in 1841, Censor in 1846, and Lumleian Lecturer in 1862 (33). In 1839 he was appointed Professor of Medicine and physician to the University College, London (33, 34). He served as a president to numerous societies including the Harveian and Westminster Medical Societies, Pathological Society of London in 1846, New Sydenham in 1858, and Royal Medical and Chirurgical Society from 1873 to 1875 (33,34). He also served as Physician Extraordinary to the Queen in 1874 and Consulting Physician for the Hospital of Consumption, Brompton for which he took part in founding in 1841 (33,35).

Williams in his book titled *The Pathology and Diagnosis of Disease of the Chest Compromising a Rational Exposition of their Physical Signs* published in 1840 described the visible and palpatory findings he identified in patients with adherent pericarditis:

But it often happens in case of close adhesions, that prior to their formation the pericardial sac has adhered in its distended state to the walls of the chest at the left of the sternum, so that when the heart also adheres to the sac, it constantly pulsates in close contact with their walls. This combination of circumstances gives us very appreciable signs. In the first place, the motions of the heart may be seen and felt much more plainly and widely than usual, drawing in the intercostal spaces at each systole. Then these motions, instead of being, as usual intercepted by the expansion of the lung in a full inspiration, are always close to the walls of the chest; for these walls, instead of, as usual rising from the heart upwards and outward at each inspiration, carry the heart with them in all their movements. Under these circumstances, therefore, there will be proportioned to the adhesion and the size of the heart, a space in which the pulsation are felt, and the sound on percussion is always dull in every stage of respiration, and in every posture of the body... *When the heart is thus generally adherent to the pericardium, and this to the diaphragm and walls of the chest, the enlargement of the organ, which very commonly ensues, cannot readily take place as usual, downwards, and to the left; but it proceeds upwards and downwards, carrying with it the wall of the chest, to which it gives a remarkable projection about the ends and cartilages of the middle ribs. I have seen this accompanied by a retraction or hollow at the epigastrium. (36, p. 240; emphasis added)*

Thus, Williams sign refers to the systolic protrusion of the precordium and retraction of the epigastrium in patients with adherent pericarditis (Table 1). We are unaware of any studies that evaluated the sensitivity or specificity of this sign.

Bouillaud Sign

Jean-Baptiste Bouillaud (1796-1881) was born in Bragette, France, and received his medical doctorate in 1823 with the thesis titled *Essai sur le diagnostic des anevrismes de l'aorte et spécialement sur les signes que fournit l'auscultation dans cette maladie* ("Test on the Diagnosis of Aneurysms of the Aorta and Especially on the Signs That the Auscultation Provides in This Disease") (37). He

was elected to the French Academy of Medicine in 1826. He was a professor of clinical medicine at Hôpital de la Charité and physician at Hôpital de la Pitié, Paris, in 1831, and in 1848 served as Dean of the Paris Faculty of Medicine (37,38). He was elected President of the French Academy of Medicine in 1862, President of the First International Congress of Medicine in Paris in 1867, Commander of the Legion d'Honneur and member of the Institut de France in the section of medicine of the Academie des Sciences in 1868 (39).

Bouillaud made a number of significant contributions to medicine, particularly in the field of cardiovascular and neurological diseases. He performed a detailed analysis weighing and measuring hearts, differentiated different types of valvular heart diseases through auscultation, identified the *bruit de diable* (venous hum heard over the right internal jugular vein) and *bruit de rappel* (false reduplication) of the second heart sound (open-snap) heard over the apex in patients with mitral stenosis, gallop rhythm, *faux pas du coeur* (weak heart beat and absent peripheral pulse), congenital heart disease, neurologic disease (identified that the speech center is localized in the anterior lobe of the brain and that the cerebellum is involved in coordinate movements), and tympanic sound heard on percussing the chest above the level of a pleural effusion (later reported by and eponymously named Škoda's sign) (37,38).

In addition to the signs that bear his namesake, included and discussed are other discoveries in the field of cardiovascular medicine for which Bouillaud is credited. We included this information not only because of its historical importance, but also to provide the reader with an appreciation of the extent and depth of his overall contribution to medicine—one which may not be well recognized. In the preface to his book, *Traité clinique des maladies du coeur* (“Clinical Treatise of Heart Diseases”) published in 1835, he described and assigned the terms endocardium and endocarditis to the heart which has also been termed in honor of Bouillaud's discovery, the *Maladie de Bouillard*, by Armand Trousseau, or “Bouillaud's cardiac sign” (40). Bouillaud assigned a “law of coincidence” which involved establishing an association between articular disease and inflammatory involvement of all layers of the heart (pancarditis) in acute generalized articular rheumatism (rheumatic fever) (41). Bouillaud reported in a paper titled “De l'oblitération des veines et de son influence sur la formation des hydropisies partielles: Considérations sur les hydropisies passives et générales” (“Obliteration of the Veins and Its Influence on the Formation of Partial Dropsy: Considerations on the Passive and General Dropsy”) the presence of dropsy (later termed edema) occurring in the lower extremities of seven patient caused by obliteration of the vein by a fibrinous clot. In three of these patients, there was tumor identified at autopsy (42). It is recognized that this report was published over 30 years prior to the Virchow description and coining of the terms *thrombosis* and *embolism* in 1856 and 1860, respectively, and 50 years prior to Trousseau's paper on cancer and thrombosis published in 1873 (43–45). Bouillaud also described a metallic sound heard over the heart in patients with cardiac hypertrophy, acknowledging Laënnec's prior discovery (46). Bouillaud in 1846 reported a method for diagnosing adhesive pericardium:

[i]t is only by means of certain physical signs, so far neglected, that for some years now we have been able to establish the diagnosis in several individuals, a diagnosis still rather obscure for us when we

published the first edition of the “Clinical Treatise of Heart Diseases.” *In six or seven subjects, we have announced the existence of an intimate and general adhesion of the pericardium to the following signs: (i) evident depression of the precordial region, depression which is analogous to that observed in one of the sides of the chest as a result of pleurisy also terminated by adhesion.* This sort of narrowing of the precordial region seems to me today a sign of high importance. If the hand and ear are applied to the precordial region, one recognizes that the heart does not move as freely as it does in the normal state; its beats are somewhat impeded and the apex of the heart does not strike the chest wall as usual with a sharp and distinctive force. (47, pp. 415–416; emphasis added)

Thus, the Bouillaud sign refers to the presence of persistent retraction of the precordium caused by adhesive pericarditis (Table 1) (5). We are unaware of any studies that evaluated the sensitivity or specificity of this sign.

Škoda Sign

Josef Škoda (1805–1881) was born in Pilsen, Bohemia (currently Czech Republic), and received his medical degree from University of Vienna in 1831. In Vienna, he worked with Karl von Rokitansky's Pathology–Anatomy Institute, followed by an appointment as an assistant physician in 1831, full physician in 1841, and in 1846, professor of clinical medicine in the Internal Department of the K. K. Allgemeines Krankenhaus (General Infirmary) (48). Both he and Rokitansky were considered the founders of the new Vienna School of Medicine (48). His primary research interest and studies were centered around the effects of percussion and auscultation on physical acoustics that cumulated with the publication of these findings in 1839 in the book titled *Abhandlung über Perkussion und Auskultation* (“Treatise on Percussion and Auscultation”) (49). In this text, he described the better known percussion tympanic sound heard above a pleural effusion. In 1846, he was appointed professor and Chair of Internal Diseases, and in 1849 Vice Dean of the medical faculty, Vienna Faculty of Medicine (50).

Josef Škoda described three patients with an adherent pericardium associated with systolic depression and diastolic elevation at the intercostal spaces to the left of the apical heart beat:

[t]he diagnosis of this abnormal condition was always based on phenomena from which it could be concluded that during systole the heart does not move down and to the left, but rather, the apex of the heart is pulled to the right and upwards... *The apex of the heart does not produce a systolic shock; one either does not feel at all, or it seems to give a push during diastole**). *At the interscapular spaces corresponding to the apex of the heart, and at one or two higher intercostal spaces, depressions become visible with each systole, where, in addition to the union of the heart with the pericardium, the pericardial and costal pleura adhere. Without the latter adhesion, a retraction of the left-sided intercostal spaces does not take place, and in such cases one must try to recognize the systolic retraction of the apex by the*

sense of touch... The investigation must also be based on the fact that, at the same time as the systolic retraction of one or more intercostal spaces, the apex of the heart is now driven against the chest wall. The systolic retraction of the lower half of the sternum is a sure sign of the fusion of the heart with the pericardium and fixation of the heart on the spine. (51, p. 314; emphasis added)

Thus, the Škoda sign refers to an indentation or depression at the apex or to the left of the heart with systole and elevation at the same area occurring during diastole (Table 1). We are unaware of any studies that evaluated the sensitivity or specificity of this sign.

CONCLUSION

Through inspection, physicians during this time period observed depressions and bulging of the chest and abdominal walls as a method to detect pericardial effusions and adhesive pericarditis. To the best of our knowledge, there are no studies that evaluated the sensitivity or specificity of these signs. Thus, their usefulness and applicability in modern-day clinical practice is unknown. Furthermore, patients now more commonly present earlier in the course of this disease, and thus, there are fewer more advanced cases, making the detection of these sign less likely. Nevertheless, they are important to appreciate as they reemphasize to clinicians the skill of inspection or observation as a crucial skill to master during the initial part of the physical examination.

Peer-review: Externally peer-reviewed.

Author Contributions: Conceived and designed the experiments or case: FY, HT, ESY, JJM, SY. Performed the experiments or case: Not applicable. Analyzed the data: FY, HT, ESY, JJM, SY. Wrote the paper: FT, HT, ESY, JJM, SY.

Conflict of Interest: The authors have no conflict of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

REFERENCES

1. Skinner HA. The Origin of Medical Terms. Baltimore: The Williams & Wilkins Company; 1949. [CrossRef]
2. Inspection (n.) Online etymology dictionary. Available from: URL: <https://www.etymonline.com/word/inspection>.
3. Willius FA, Keys TE, editors. Joseph Leopold Auenbrugger. Classics of Cardiology Volume One. New York, NY: Henry Schuman, Inc. Diver Publications, Inc; 1941. pp.191-2.
4. Auenbrugger L. Text and documents On percussion of the chest being a translation of Auerbrugger's original treatise entitled "Inventum novum ex percussione thoracis humani, ut singo abstrsos interni perceptoris morbos detegendi." [Vienna, 1761] Translation by John Forbes, Introduction by Henry E. Sigerist. London: The Johns Hopkins Press; 1824.pp.73-403.
5. Birrer RB, Birrer CD. Medical diagnostic signs. A Reference Collection of Eponymic Bedside Signs. Springfield, Ill: Charles C. Thomas Publisher; 1982.
6. Spodick DH. Acute Pericarditis. New York: Grune and Stratton, Inc.;1959.
7. Wagner R. Grundriß der Encyklopädie und Methodologie der medizinischen Wissenschaften nach geschichtlicher Ansicht: mit Rücksicht auf die naturhistorischen Disziplinen, und als Einleitung in das Studium der Medizin für akademische Vorlesungen. JJ Palm und Enke; 1838.
8. Heim EL. Epoche Napoleon von der Bastille bis Waterloo. 2003-2018. (cited 2018 December 1). Available from: URL: <http://www.epoche-napoleon.net/de/bio/h/heim.html>.
9. Heim EL. Stiftung Historische Kirchhöfe und Friedhöfe in Berlin-Brandenburg. (cited 2018 December 1). Available from: URL: <http://stiftung-historische-friedhoeft.de/ernst-ludwig-heim/>.
10. Bauer J. Ancestry-birth-youth-first education-university. In: Life of Alexander von Humboldt. Translated and arranged from the German of Klencke & Schlesier by Juliette Bauer. London: Ingram, Cooke & Co.; 1851.pp.8-9.
11. Heim EL, editor. Neuer Nekrolog der deutschen zwölfter Jahrgang, 1834. Zweiter Teil. Weimar: Druck und Verlag von Bernh. Fr. Voigt; 1836.pp.705-36.
12. Heidel C, Lienert M, editors. Kreysign, Friedrich Ludwig. Die Professoren der Medizinischen Fakultät Carl Gustav Carus Dresden und ihrer Vorgängereinrichtungen 1814-2004. München: KG Saur; 2005.p.20. [CrossRef]
13. Friedrich Ludwig Kreysig: German physician. (cited 2018 December 1). Available from: URL: <https://upclosed.com/people/friedrich-ludwig-kreysig/>.
14. Kreysig. Pierer's Universal-Lexikon. 1860;9:810-811. (cited 2018 December 1). Available from: URL: <http://www.zeno.org/nid/20010278710>.
15. Kreysig (Friedr. Ludw.). Callisen ACP, editor. Medicinisches Schriftsteller-Lexikon der Jetzt Lebenden Verfasser. 29. Band. Copenhagen: Taubstummen-Institute zu Schleswig; 1841.p.346.
16. Friedrich Ludwig Kreysig. Stadtwiki Dresden. 2016. (cited 2018 December 2) Available from: URL: http://www.stadtwikidd.de/wiki/Friedrich_Ludwig_Kreysig.
17. Kreysig FL. Neuntes Kapitel. Ueber die Unterscheidungsmerkmale der Verwachsung des Herzbeutels mit dem Herzen. Die Krankheiten des Herzens Systematisch Bearbeitet und Durch Eigne Beobachtungen Erläutert. Zweiter Teil. Berlin: Maurerschen Buchhandlung; 1816. pp.616-28.
18. [Obituary].William Rutherford Sanders. Edinb Obst Soc; 1881: 939-49.
19. Sanders J. General list of the members of the Royal Medical Society of Edinburgh. Edinburgh: A. & D. Padon; 1806.p.28.
20. Sanders J. Treatise on pulmonary consumption, in which a new view of the principles of its treatment is supported by original observations on every period of the disease. To which is added, an Inquiry, proving that the medicinal properties of the digitalis, or fox-glove, are diametrically opposite to what they are believed to be. The Critical Review, or, Annals of Literature. Series 3. 1808; 13: 309-15.
21. Sander J. Remarques sur le diagnostic de l'adhérence du péricarde au cœur. Arc Gén de Méd 1823;1: 153-7.
22. Laennec RTH. Traité de l'auscultation médiante et des maladies des poumons et du coeur. Translated: Forbes, John. New York: Published by Samuel Wood & Sons; 1830.
23. Lee S, editor. Hope James. Dictionary of National Biography. Volume 27. New York: Macmillan and Co. London: Smith, Elder, & Co; 1891. pp.316-7.
24. Hope J. A Treatise on the Diseases of the Heart and Great Vessels. Philadelphia: Lea & Blanchard; 1842.
25. Fye WB. Profiles in cardiology. James Hope.Clin Cardiol 1989; 12(6): 358-9. [CrossRef]
26. Willius FA, Keys TE, editors. James Hope. Classics of Cardiology. Volume 2. New York: Henry Schuman, Inc. Dover Publication, Inc; 1941.

- pp.403-18.
27. James Hope. Lives of the fellows. Royal College of Physicians. 2009. (cited 2018 December 1). Accessed from: URL: <http://munksroll.rcplondon.ac.uk/Biography/Details/2262>.
 28. [No author listed]. Dr. James Hope. *Nature* 1941; 147: 605–6. [CrossRef]
 29. Hope J. Principles and illustrations of morbid anatomy adapted to the elements of M Andral and to the cyclopaedia of practical medicine being a complete series of lithographic drawings, from originals by the author: with description and summary allusions to cases, symptoms, treatment, & c. Cincinnati: DeSilver and Burr; 1844.
 30. Grant K, editor. Period II. Professional Education. Memoir of the late James Hope, M.D. Physician to St. George's Hospital, &c. by Mrs. Hope. London: J. Hatchard & Sons; 1842.pp.20–51.
 31. Hope J. Adhesions of the pericardium. In: *A Treatise of the Disease of Heart and Great Vessels*. 3rd ed. London: John Churchill; 1839. pp.191–5.
 32. Spodick DH. *Chronic and Constrictive Pericarditis*. New York: Grune and Stratton; 1964.
 33. Lee S, editor. Williams, Charles James Blasius (1805-1899). *Dictionary of National Biography*. Volume XXI. New York: The Macmillan Company. London: Smith, Elder, & Co; 1909.pp.383–4.
 34. [Obituary]. Charles James Blasius Williams, MD, F.R.S., F.R.C. P. Physician- extraordinary to the queen. *BMJ* 1889; 1(1474): 745–6. [CrossRef]
 35. Williams, Charles James Blasius, M.D., F.R.S. Analytical and classified catalogue of the library of the parliament of Queensland. Denis O'Donovan, editor. Volume III Q-Z and Supplement. Brisbane: E. Gregory, Government Printer; 1900.p.2670.
 36. Williams CJB. Chapter III. Inflammatory diseases: pericarditis. *The Pathology and Diagnosis of Diseases of the Chest Compromising a Rational Exposition of Their Physical Signs*. 4th Edition. London: John Churchill; 1840.pp.233–46.
 37. Rolleston JD. Jean Bapiste Bouillaud (1796-1881): A pioneer in cardiology and neurology. *Pro R Soc Med* 1931; 24: 1253–62.
 38. Silverman BD. Jean Bapiste Bouillaud. *Clin Card* 1996; 19: 836–7.
 39. Eling P, Brunia K. Who was the red dean? *J Hist Neurosci* 2017; 26; 111–8. [CrossRef]
 40. Bouillaud J. Préface. In: *Traité clinique des maladies du cœur: Précède de recherches nouvelles sur l'anatomie et la physiologie de cet organe*. Paris: J.B. Bailliere; 1835.p.vii-xxi.
 41. Bouillaud J. *Traité clinique du rhumatisme articulaire et de la loi de coincidence des inflammations du cœur avec cette maladie*. Paris: J-B. Bailliere; 1840.
 42. Bouillaud J. De l'oblitération des veines et de son influence sur la formation des hydropisies partielles: Considérations sur les hydropisies passives et generals. *Archives Gén de Méd* 1823; 2(1): 188–204.
 43. Virchow R. Phlogose und Thrombose in Gefässsystem. *Gesammelte Abhandlungen zur wissenschaftlichen Medicin*. Frankfurt AM: Verlag von Meidinger Sohn & Comp.; 1856.
 44. Virchow R. Lecture X, Purulent cysts in the heart, cellular pathology as based upon physiological and pathological histology. Twenty lectures delivered in the pathological institute of Berlin during the months of February, March and April 1858. Translated from the second edition of the original by Frank Chance. London: John Churchill; 1860. pp.196–219. [CrossRef]
 45. Trousseau A. Lecture on Clinical Medicine: Delivered at the Hotel-Dieu, Paris, Volume 5. Phlegmasia Alba Dolens (lecture XCV). In: Cormack JR, Bazire PV trans. Philadelphia: Lindsay & Blakiston; 1873.pp.281–332.
 46. Bouillaud J. Bruits anormaux du coeur. II. Des bruits anormaux produits par la percussion du coeur contre les parois pectorals. In: *Traité clinique des maladies du coeur, précède de recherches nouvelles sur l'anatomie et la physiologie de cet organe*. Paris: J.B. Bailliere; 1835. pp.193–5.
 47. Bouillaud JB. De la péricardite ou de l'inflammation du péricarde, et de ses suites. Caractères anatomiques. In: *Traité de Nosographie Médicale*. Paris: J.B. Bailliere; 1846.pp.405–17.
 48. [Obituary] Professor Josef Skoda. *Medical News*. Edinb MJ 1881; 27: 286–7.
 49. Skoda J. *Abhandlung über Perkussion und Auskultation*. Vienna: J.G. Ritter von Mösel and Braumuller; 1839.
 50. Sakula A. Joseph Skoda, 1805-81: A centenary tribute to a pioneer of thoracic medicine. *Thorax* 1981; 36: 404–11. [CrossRef]
 51. Skoda J. Ueber die Erscheinungen, aus denen sich die Verwachsung des Herzens mit dem Herzbeutel an lebenden Menschen erkennen lässt. *Zeitschrift der Gesellschaft der Aerzte zu Wien*. 1852; 1: 306–15.