

# Corrigan's Disease

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*"Amn't I up since the damp dawn, marthared mary allacook, with Corrigan's pulse and varicoarse veins, my pramaxle smashed, Alice Jane in decline and my oneeyed mongrel twice run over, soaking and bleaching boiler rags, and sweating cold, a widow like me, for to deck my tennis champion son, the laundryman with the lavandier flannels?"*

James Joyce\*

It is not inappropriate that this paper should open with Joyce's tribute to Dominic Corrigan, for although the occasion of this presentation was to mark the centenary of the death of Corrigan, it was delivered on February 2nd, the day of the month on which James Augustine Joyce drew first breath at 41 Brighton Square, Dublin.

On April 1st, 1832, D.J. Corrigan, M.D. one of the Physicians to the Charitable Infirmary, Jervis Street, Dublin, Lecturer on the Theory and Practice of Medicine and, Consulting Physician to St. Patrick's College, Maynooth, writing from 13 Bachelor's Walk, published a paper in the *Edinburgh Medical and Surgical Journal* entitled "On Permanent Patency of the Mouth of the Aorta, or Inadequacy of the Aortic Valves". Although Corrigan wrote many other papers and achieved eponymous recognition elsewhere, (Table) it is on this paper that is based the immortality of his fame as a doctor. Let us begin by reappraising this work.

## Corrigan's Paper on Permanent Patency

The attention of the reader is claimed instantly by the opening sentence — "The disease to which the above name is given has not, so far as I am aware, been described in any of the works on diseases of the heart." It has been argued by historians and cardiologists that this bold claim by Corrigan was unjustified — a point to which I shall return shortly — but lest we should make the same error may we direct our attention to another sentence in the introductory paragraph in which Corrigan elaborates on what he means by a description of the disease. Remarking that it is not uncommon, he adds that "it forms a considerable proportion of cases of deranged action of the heart, and it deserves attention from its peculiar signs, its progress, and its treatment". Corrigan's contribution must therefore be viewed in this context, that is as a comprehensive account of a condition which had been recognised previously, but had not hitherto been described fully "in any of the works on diseases of the heart". He explained that he was giving

preference to the term *Permanent Patency* over his own title of *Inadequacy of the Aortic Valves* "for the sake of uniformity" because Dr. Elliotson had used the former name for a similar state of the mitral valve. In a later paper<sup>2</sup> in which he describes chronic fibrosis of the lung he shows the same consideration for the medical nomenclature; he uses the term *cirrhosis of the lung* ("this disease is in the lung what cirrhosis is in the liver") preferring to "add an additional fact than a new name to our science". He could not have known that both papers were to add two eponyms to the medical literature.

He begins his classic description of aortic regurgitation by describing and illustrating with engravings the pathology of the condition. "The pathological essence of the disease consists in inefficiency of the valvular apparatus at the mouth of the aorta, in consequence of which the blood sent into the aorta regurgitates into the ventricle." This may occur because the valves are "absorbed in patches", presumably due to endocarditis; because one or more of the valves are ruptured, again probably due to endocarditis; or because the valves are "tightened or curled in against the sides of the aorta, so that they cannot spread across its mouth", this being due to rheumatic disease; or "the valves without any proper organic lesion may be rendered inadequate to their function by dilatation of the mouth of the aorta", such as occurs in aneurism of the aorta, or dilatation in elderly patients without the valves being diseased in themselves.

Corrigan does not consider the symptoms of the disease to be helpful in diagnosis. "There are frequently convulsive fits of coughing, more or less dyspnoea, sense of straitness and oppression across the chest, palpitations after exercise, sounds of rushing in the ears, and inability to lie down." In other words the symptoms of heart failure in varying degree which "neither tell us the seat of the disease, nor the extent of the danger".

The diagnosis, he claims, is to be made "by the certainty of the physical and stethoscopic signs". He proposes a triad of diagnostic signs —

*"1st, Visible pulsation of the arteries of the head and superior extremities,*

\*Finnegans Wake. Faber and Faber. London 1975. p.214. Line 23.

2nd, *Bruit de Soufflét* in the ascending aorta, in the carotids and subclavians,

3rd, *Bruit de Soufflét* and *fremissement*, or a peculiar rushing thrill felt by the finger, in the carotids and subclavians."

He adds immediately — "In conjunction with these may be reckoned the pulse," which is "always full and vibrating" and later he elaborates further on the pulse in discussing the differential diagnosis of aortic stenosis in which the pulse "is small and contracted", whereas in regurgitation "it is invariably full and swelling". Corrigan's clinical description of aortic regurgitation emphasises the *visible pulsation* of the arteries of the head, neck and superior extremities which is more marked after exertion and in the standing position or by elevation of the arm or leg. The *bruit de soufflét* and its thrill or *fremissement* are synchronous with the visible pulsation and therefore systolic in timing, but when "the deficiency of the valves is considerable" there is a double *bruit de soufflét*, the first murmur being "from a rushing of blood up the aorta, the second from a rushing of it back into the ventricle". As Mulcahy has suggested it would not have been easy to detect the early diastolic murmur of mild aortic regurgitation with the early monaural stethoscope, and most of Corrigan's advanced cases probably had aortic stenosis and regurgitation. He stresses that the systolic murmur of aortic valve disease radiates upwards from the heart "in a line corresponding with the ascending aorta" to become maximal at the arch and in the large vessels arising from it, and can thus be differentiated from the systolic murmur of mitral regurgitation which is maximal at the apex of the heart.

Describing the progress of the disease he pointed out that in his series of eleven patients, only two were females and he had not seen it occur before the age of twenty, unlike mitral regurgitation which could be congenital or acquired in childhood. Often no cause could be determined but in one case there had been a definite episode of acute rheumatism, and in some there had been a history of inflammatory affection "of the chest months or years earlier". The duration of the disease depended on the extent of regurgitation, but none of Corrigan's patients died in less than two years from onset, and some lasted seven or eight years. Death was never sudden, and "under proper restriction the patient is not only able to lead an active life for years, but is actually benefited by doing so".

The differential diagnosis must include aortic stenosis, disease of the auriculoventricular valves, aneurism of the aorta or innominate artery, nervous palpitation, and asthma. In discussing the diagnosis of aneurism he makes an apology for previously publishing a paper in which he attributed the signs of aortic regurgitation to aneurism. "These cases led me into an error; for meeting the signs of permanent patency of the aortic orifice in conjunction with aneurism, I erroneously attributed to the aneurism the signs which arose from the permanent patency. Aneurism of the aorta itself does not produce the signs arising from permanent patency of the mouth of the aorta. It can only produce them — by involving in the dilatation the mouth of the aorta".

In discussing treatment Corrigan voices his criticism of the popular remedies for cardiac disease — "it would seem, from the perusal of works on the subject, that one principle were thought sufficient for guiding the treatment of nearly all the diseases of this important organ. With the idea of heart disease, is too frequently

associated the notion that such disease, without regard to its precise nature or its cause, requires the action and continued enforcement of measures calculated to exhaust strength and depress vital energy; and this error is sanctioned by the standard works on the treatment of heart disease". To prove his point he quotes from the works of Corvisart, Laennec, and Bertin in which bleeding, blistering, starvation, and purging are advocated. He points out that the cardiac hypertrophy of aortic regurgitation is "a provision of nature to make the power of the part equal to the obstacle it has to overcome," and yet while "nature has been making the organ equal to its task; . . . medicine has been directed to counteract nature's efforts, and, by weakening the organ, to render it totally incapable of its task". Corrigan like his senior colleague in the Meath, Robert Graves who "fed fevers" was courageously taking on the practitioners of established treatment with an iconoclastic approach — "A generous and sufficient diet of animal and vegetable fat should be advised, at the same time that an abstinence from those beverages, such as malt liquors, which increase much the mass of the fluids, should be enjoined. It is not at all necessary that the patient should be prohibited from attending to his business or profession, provided that he do not devote to it so much attention as to produce debility. And as there is among patients who have learned that they are afflicted with heart disease an universal dread of sudden death, it is necessary to undeceive them on this point; and in the present instance it can be done with perfect safety, as the termination of the disease is never sudden".

Corrigan does, however, advocate bleeding in associated inflammatory conditions, and in heart failure in which the symptoms "seem to arise from an increase in bulk in the absolute mass of blood circulating". The bleeding should be large and "is very different from the repetition of those irritating small bleedings that are usually practised."

As for the use of digitalis in aortic regurgitation Corrigan was dogmatic that it should never be used. His reasoning was intriguing if a little fanciful; he maintained that digitalis by slowing the heart would permit greater regurgitation in diastole whereas a modest increase in heart rate by having the opposite effect was to the patient's advantage. (A recent study suggests that digitalis may indeed be harmful in aortic regurgitation\*). Finally, he recommends the vigorous use of an opiate in cardiac failure, and he suggests that mercury if used early might check the progress of acute rheumatism and prevent damage to the valves.

Almost 150 years on there is little that cardiologists can add to this comprehensive description of the clinical entity that is aortic regurgitation. We know more about the infective causes and how to prevent them; we have added to the etiological possibilities with diseases such as Marfan's syndrome and ankylosing spondylitis; we have clarified the clinical picture with the help of better designed stethoscopes, catheterisation, radiology and phonocardiography, and we would place more emphasis on the diastolic murmur and the character of the pulse than did Corrigan; we would have to agree in principle with most of Corrigan's recommendations on the management and treatment of established disease, although we might find a place for digitalis when failure was present, and we could substitute diuretics for blood-

\* Hockings BEF. et al. *Br. Heart J* 1980; 43: 550.

letting. The major contributions of Corrigan's cardiological successors have been the prophylaxis and treatment of rheumatic fever and infectious endocarditis, and the development of surgery to permit successful aortic valve replacement, an event that Corrigan's considered very unlikely, but was there not a glimmer of hope when he stated? — "although the cure of *Inadequacy of the Aortic Valves* is probably out of reach of medicine, a correct knowledge of the nature of the affection is not the less necessary."

#### Claims to Priority

Corrigan's paper succeeds in describing for the first time the peculiar signs, progress and treatment of aortic regurgitation. There had been mention of the condition in the literature prior to 1832 but so brief are some of the references to the disease that it has taken over a century of esoteric research by cardiological historians to compile the present list

Interpretation of the function of the valves of the heart had to await the discovery of the circulation by William Harvey<sup>1</sup> in 1628 —

"The several valves of the heart are so arranged that the blood once received into the ventricles shall never regurgitate and once forced into the pulmonary artery and aorta shall not flow back upon the ventricles."

The first reference to the consequences of valvular incompetence is by William Cowper<sup>2</sup> in 1706,—

"These valves (aortic) in this case were somewhat thicker, and not so pliable as naturally, and did not so adequately apply to each other . . . whence it happened sometimes that the blood in the great artery would recoil and interrupt the heart in its systole . . ."

Raymond Vieussens<sup>3</sup> in 1715 gave a classical description of the pulse —

"I examined the pulse which appeared to me very full, very rapid, hard, irregular, and so strong that the artery of first one and then the other arm struck the tip of my fingers as much as a cord would have done which was tightly stretched and violently shaken."

Vieussens also clearly related the pathological condition of the valves to deranged function —

"The left ventricle could not push into the aorta the blood it should furnish except by very violent contractions; and as the valves were cut off, their ends could not approach each other close enough so as not to allow any opening between them; that is why every time the aorta contracted, it sent back into the left ventricle a part of the blood which it had just received."

J. B. Morgagni<sup>4</sup> in 1769 made brief mention of the condition —

"For as one of the valve cusps was bony and the other indurated they became less yielding to the blood, both obstructing its exit from the ventricle and failing to prevent its return. Eventually these circumstances were bound to overload the heart and lungs."

James Hodgson<sup>5</sup> in 1815 described aortic regurgitation in association with dilatation of the aorta.

The first comprehensive account of aortic regurgitation was written in 1822 by Thomas Cuming,\* Physician to the Dublin General Dispensary and the Wellesly Fever Hospital, and Lecturer at the Richmond School of Medicine. His paper entitled "A Case of Diseased Heart with Observations" was published in the *Dublin Hospital Reports of 1822* and passed unnoticed until Evan Bedford<sup>9</sup> brought it to attention in

1967. Cuming's patient was conscious of "violent pulsation of the heart and larger arteries" which "were so strong as to be visible from a considerable distance," and the pulse was "regular, full, hard, and vibrating". At autopsy the heart was greatly enlarged, the coronary arteries were patent and the aortic valve was shrivelled with irregular, thickened, cartilaginous margins which "when stretched to the uttermost . . . did not reach within the tenth of an inch of the openings of the coronary artery." Cuming suggested that "during each diastole of the ventricle, therefore, a quantity of blood flowed back through this aperture from the artery, which meeting with the stream of blood flowing in at the same time from the auricle, occasioned a violent and supernatural effort in the ventricle to empty itself of its contents." Cuming differentiates between aortic regurgitation in which the pulse was "full, hard, and vibrating," and aortic stenosis with its "small, feeble, and thready pulse," and in this he predates Corrigan to whom credit for this distinction is usually attributed. Cuming believed that death in his patient was due to "an intense degree of asthma" which he correctly attributed to "a temporary obstruction to the circulation through the lungs, in consequence of the left side of the heart being unable to empty itself of its contents."

This remarkable description of aortic regurgitation does not match Corrigan's comprehensive treatise, but is noteworthy for a number of reasons as Evan Bedford<sup>9</sup> has observed —

"He was probably the first to describe visible arterial pulsation as a feature of aortic incompetence and to explain its mechanism seven years before Hodgkin's account and ten years before Corrigan's. His description of the pulse is more accurate than Corrigan's and his distinction between the small pulse of aortic stenosis and that of pure incompetence at this early date is noteworthy. His account of left heart failure due to back pressure is quite clear as Hope's much quoted description ten years later. The coronary arteries were often overlooked in post-mortems at this time . . . This case is probably the first instance of angina pectoris with aortic incompetence in which coronary disease was specifically excluded."

The next important contribution on the subject was a paper by Thomas Hodgkin on "Retroversion of the Valves of the Aorta" which appeared in the *London Medical Gazette*<sup>10</sup> in 1829 just three years earlier than Corrigan's paper. It is not difficult to see why Corrigan (and indeed most physicians of the time) overlooked Hodgkin's contribution. The *London Medical Gazette* first appeared in 1827 and it was some years before it attracted a general readership. Perhaps of greater relevance was Hodgkin's method of presentation which was disjointed and unlikely to attract attention. The paper is in the form of two letters from Hodgkin to Astor Keys (who drew his attention to the condition) the first of which was presented to the Hunterian Society in 1827 and the second in 1829. At the start of each letter Hodgkin stressed that some of his cases were not as fully studied as he would have liked, but nonetheless he hoped that "in their imperfect state, they still possess some degree of interest, as connected with an affection hitherto but little known". A pathological description is given for each case, but he does not distinguish the lesion that cause regurgitation as does Corrigan, and he goes to considerable lengths to attribute the cause to — "urgen straining". He gives a good description of carotid

pulsation — “Besides the general and inordinately violent arterial action, which was very rapid and frequent, though perfectly regular, there was a remarkable thrill in the pulse, and the carotids were seen violently beating on both sides.” In one case (his late friend Dr. Cox) he describes on auscultation “a constant *bruit de Scie*, which presented this peculiarity, that it was double attending the systole as well as the diastole . . .” and he adds “in the majority of instances there is no *bruit de Scie* accompanying retroversion of the valves.” He is of the opinion that depletion and digitalis may not be beneficial.

Hodgkin had therefore presented some of the important manifestations of aortic regurgitation three years before Corrigan, and had he taken the same care as Corrigan in presenting his findings he might have achieved dual eponymous distinction. As it was Hodgkin's paper languished in obscurity until brought to attention in 1871 by Samuel Wilks,<sup>11</sup> who also resurrected his paper on the lymphoma which now bears his name.

Neither Cuming nor Hodgkin made any claim to priority, but not so James Hope of St. George's Hospital in London who had no hesitation in quickly claiming aortic regurgitation for his own. In the third edition of his book on heart disease<sup>12</sup> which appeared in 1839 he stated — “To the murmurs of Laennec, I added, in the first edition of this book in December 1831, the murmurs from regurgitation” and this claim is quite justified. He had indeed mentioned the diastolic murmur of aortic regurgitation, its radiation, the reason for its poor intensity, and he had referred to the “full, strong and regular, but *compressible* pulse” of the condition.

However, nowhere in this excellent pioneering work on cardiology does he describe the disease as an entity in itself and his comments which are not many are dispersed throughout the text. He goes on to claim that he had discovered the disease in June 1825 “in the remarkable case of Christian Anderson” and that he “also taught the regurgitation at St. Bartholomew's Hospital in 1826, and at La Charite, Paris, in 1827.” The latter claim does not, of course warrant consideration and to put it forward was rather naive, but if we examine the “remarkable case of Christian Anderson” it becomes clear that he was describing mitral rather than aortic regurgitation because the aortic valve was “natural” at autopsy, and the murmur arose from “regurgitation through the auricular valves.” In fact, Hope in dismissing Corrigan's “supposed new disease” shows that he had not studied Corrigan's paper very carefully. He accuses Corrigan of being unaware of not only his work but also of that of Dr. Elliotson, and this in spite of the fact that Corrigan paid tribute to Elliotson's description of disease of the mitral valve by using his term “permanent patency”.

#### Eponymous claims

The physicians of the early nineteenth century were familiar with many of the pathological manifestations of valvular disease of the heart, and the stethoscope stimulated the younger physicians such as Corrigan and his Edinburgh contemporaries Hope and Stokes to observe and elucidate on the clinical signs of cardiac disease. Many before them had indeed described certain aspects of aortic regurgitation, but none with the exception of Cuming, Hodgkin and Corrigan had attempted to write a comprehensive treatise on the condition. So whatever the claims for priority might be,

the right to eponymous recognition must rest between this trio.

Cuming's paper though remarkable for its time did not attract attention, because as its vague title shows, he himself had failed to realise the importance of what he was describing.

Even if Hodgkin had collected his thoughts and presented the facts carefully it is evident that he did not have the same knowledge of the disease as Corrigan; his reasoning was not as succinct, and his conclusions were not as accurate or nearly as comprehensive. One way or another his paper was not noticed, whereas Corrigan's excited immediate comment and guaranteed his eponymous reputation. George Dock<sup>13</sup> has researched diligently the early references to Corrigan's paper of which but a few merit further attention.

One of the first to pass comment was Robert Graves<sup>14</sup> who recognised the importance of the paper although he did have some reservations about the dogmatism of his younger colleague's assertions. Presenting a case with clinical manifestations of aortic regurgitation but lacking pathological evidence of the condition Graves said — “I think, therefore, that I am authorised in stating, that the symptoms which are given by Dr. Corrigan, as diagnostic of permanent patency of the aortic valves, are extremely uncertain, and that he has established his diagnostic marks too hastily.” He does add immediately that it was not his intention “in the slightest degree, to undervalue his very ingenious contribution; he has treated of a new and difficult subject, and his essay is highly valuable for its able and well digested practical remarks.” It is of interest to note that the celebrated Andral thought highly of his Irish colleague — “to Dr. Corrigan of Dublin we are in the first instance indebted for a knowledge of this structural anomaly”<sup>15</sup>. This was not Andral's first time to speak on Corrigan's behalf. He had strongly supported Corrigan when he and Stokes unsuccessfully applied to the College of Physicians for the King's Professorship of the Practice of Medicine in 1841.

Paris, 2 Aout, 1841.

Monsieur et très honorable Confrere,

*Je vous envoie avec au vrai plaisir l'attestation que vous me demandez; je connais les différents mémoires que vous avez publiés; ils ont utilement contribué aux progrès de la science; ils annoncent tous un medecin-habitué à observer, à tirer parts des faits et qui sait exposer ses recherches avec autant de methode que de clarté. D'après tout ce que je sais de vous, je n'hésite pas à dire que vous remplirez dignement, et au profit de la science, une chaire de médecine pratique.*

*Veillez agréer Monsieur, l'expression de mes sentiments très distingués.*

ANDRAL

*Professeur de Pathologie, à la faculté de médecine de Paris, medecin de l'Hopital de la Charité, etc.*

The first paper to actually give aortic regurgitation the eponymous appellation of “Corrigan's Disease” was the French journal *La Lancette Française. Gazette Des Hopitaux*<sup>16</sup> which in 1839 published a case report on *Maladie de Corrigan* which concluded — “it is on these

Eponym	Original Paper	Source of First Mention of Eponym where known
1. <i>Maladie de Corrigan</i> Corrigan's Disease	"Permanent Patency of the Mouth of the Aorta". <i>Edin. Med. Surg. J.</i> 1832; 37: 225.	<b>Gazette Des Hospitaux.</b> 1839: 1: 466.
2. Corrigan's Pulse	Ibid.	Charles Cowan. 1836 quoted by Dock G. <i>An Med. Hist.</i> 1934; 6: 381.
3. Corrigan's Sign	"Aneurism of the Aorta". <i>Lancet.</i> 1832; 1: 586.	<i>Medical Classics.</i> Williams-Wilkins. Co. Baltimore, U.S.A. 1937; 1: 672. Sometimes used to denote visible pulsation in permanent patency.
4. <i>Maladie de Corrigan</i> Corrigan's Cirrhosis	"On Cirrhosis of the Lung". <i>Dub. J. Med. Sci.</i> 1836; 8: 202.	"Corrigan's Cirrhosis"—Clark, A., Hadley W.J. and Chaplin, A. <i>Fibroid Diseases of the Lung.</i> London 1894. p.11. "Maladie de Corrigan"— <i>Medical Classics</i> Williams-Wilkins. Co. Baltimore, U.S.A. 1937; 1: 672.
5. Corrigan's Button	"Cure by firing". <i>Dub. Hosp. Gaz.</i> 1846; 2: 209.	McCormack, J. <i>Lancet.</i> 1846; 2: 612. The term Corrigan's button is not actually used in this paper, but probably came into use shortly afterwards.
6. Corrigan's Hammer		Garrison, F.H. <i>History of Medicine.</i> 1929. 4th Ed. p.420. "Corrigan suggested that a flagging heart may be stimulated by tapping the precordial region with a hot spoon".
7. Venous Corrigan		Paul Wood. <i>Diseases of the Heart and Circulation.</i> 2nd Ed. London 1956. p. 50.
8. Allee Corrigan Arcachon. France.		Following the publication of Corrigan's Introductory Presidential Address to the College of Physicians ( <i>Dub. Hosp. Gaz.</i> 1860; 7: 337) in pamphlet which was translated into French, the people of Arcachon near Bordeaux in gratitude named a street after him.
9. Corrigan House, Dublin, Ireland.		Headquarters of Comhairle na nOispide: Fenian Street, Dublin.
10. The Corrigan Library, The Charitable Infirmary, Jervis Street.		

#### Corrigan Eponyms

united signs that we base our diagnosis and we believe we can affirm that this man has Corrigan's Disease."

Another great French physician Armand Trousseau<sup>17</sup> used the term "Maladie de Corrigan" for both aortic regurgitation and Corrigan's description of cirrhosis of the lung. Sir Francis Cruise, a protégé of Corrigan has left us an interesting anecdote of a Parisian tribute<sup>18</sup> — "Corrigan travelled a great deal, always visiting the hospitals in his tours. Once, when in Paris, going round the wards with the physician on duty, they came to a patient whose ailment was tabulated as the 'Maladie de Corrigan'. The doctor, turning to his guest, whose card he had received, asked him if he knew Corrigan of Dublin. 'C'est moi, Monsieur', was the prompt reply. Enchanted to find who his guest was the doctor led him to the lecture theatre and presented him to the class, and a right royal reception was given to the illustrious visitor".

The eponym "Corrigan's Disease" was popular initially but then Corrigan's name was applied to the pulse and "Corrigan's Pulse" became the more popular eponym. Towards the end of the nineteenth century "Corrigan's Pulse" was being likened to the popular Victorian toy the water-hammer, and not only were the two descriptions used synonymously, but Corrigan was actually credited with coining the term which does not, of course, appear anywhere in his works. Thus in 1909, Sir

Clifford Allbutt<sup>19</sup> wrote — "The character of the pulse well known. The gifted physician to whom we owe most of our knowledge of this subject has given a memorable description of it. Corrigan compared it to the water hammer . . ."

George Dock has researched painstakingly the background to this historical error, and shown that the pulse of aortic regurgitation was likened to the water hammer as early as 1840 by Thomas Watson<sup>20</sup> — "The pulse of aortic regurgitation is sometimes at least very striking and peculiar: sudden like the blow of a hammer without any prolonged swell of an artery. It always reminds me of the well-known chemical toy, formed by including a small quantity of liquid in a glass tube exhausted of air and hermetically sealed. On reversing the tube the liquid falls from one end of it to the other with a hard, short knock, as if it were a mass of lead. The sensation given by the pulse, when there is much regurgitation through the aortic valves, is very similar to this."

#### Conclusion

Though Dominic Corrigan was not the first to draw attention to aortic regurgitation in his famous paper

1832, he was the first to describe in detail the pathology, symptoms, signs, course, prognosis and treatment of the condition. Of the earlier descriptions only those of Thomas Cuming and Thomas Hodgkin bear comparison, but it is clear that Corrigan had studied the subject in greater depth and his paper is well deserving of the recognition it has received.

A review of the literature shows that the eponym "Corrigan's Disease" was readily accepted and is fully justified as eponyms go. However, Corrigan's paper which does depict clearly the visible carotid pulsation of

aortic regurgitation, does not emphasise the palpatory characteristics of the pulse, and the eponym "Corrigan's pulse" should therefore be reserved for the visible carotid pulsation.

The term "water-hammer pulse" was not used by Corrigan, and as many contemporary clinicians and their students may not be familiar with the palpatory sensation of a water-hammer, it is suggested that the term should no longer be used.

I am indebted to Professor Risteard Mulcahy for his helpful advice.

## References

1. Corrigan, D.J. (1832) On Permanent Patency of the Mouth of the Aorta or Inadequacy of the Aortic Valves. *Edinburgh Medical and Surgical Journal*. 37: 225-245.
2. Elliotson, J. (1829) On the Recent Improvements in the Art of Distinguishing the Various Diseases of the Heart. Being the Lumeyan Lectures. London. Longman.
3. Harvey, W. (1628) *De Motu Cordis et Sangiunis*. tr. Willis, R. (1843) London. *The Sydenham Soc Ch.* 17, p. 79.
4. Cowper, W. Of Ossification or Petrifications in the Coats of Arteries, particularly in the Valves of the Great Artery. Trans. No. 299, *Phil. Tr. Roy. Soc. London*. 1703-1712; 5: 215-219. In *Classical Description of Disease* by Major R. H. Charles C. Thomas 1932. p. 306.
5. Vieussens. R. (1715) *Traité-Nouveau de la Structure et Causes du Mouvement naturel du Coeur*. Toulouse. p. 107. In *Classical Description of Disease* by Major R.H. Charles C. Thomas. 1932. p. 312.
6. Morgagni, J.B. (1761). *De Sedibus et Causis Morborum per Anatomen Indagatis, Libri Quinque*. Trans. Benjamin Alexander, London 1869. p. 684.
7. Hodgson, J. (1815) *A Treatise on the Diseases of the Arteries and Veins*. London. T. Underwood. p. 13-44.
8. Cuming, T. (1822). A Case of Diseased Heart with Observations. *Dublin Hospital Reports*. 3. 319-334.
9. Bedford, D.E. (1967) An Early Account of Aortic Incompetence by Thomas Cuming (1798-1887). *Medical History*. 11: 398-401.
10. Hodgkin, T. (1829) On Retroversion of the Valves of the Aorta. *London Medical Gazette*. 3: 433-443.
11. Wilks, S. (1871) Note on the History of Valvular Disease of the Heart. *Guy's Hospital Reports*. 16: 211.
12. Hope, J. (1839) *A Treatise on the Diseases of the Heart*. 3rd. ed. London. p. 71.
13. Dock, G. (1934) I. Dominic John Corrigan; His Place in the Development of Our Knowledge of Cardiac Disease. II. The Water Hammer Pulse. *Annals of Medical History*. 6: 381-395.
14. Graves, R. (1833) Clinical Lectures. Lecture IX. *London Medical and Surgical Gazette*. 3: 74-80.
15. Herbert, T. (1846) Translation of Laennec. London p. 848.
16. Signed "K . . ." (1839) Maladie de Corrigan. *La Lancette Francaise: Gazette Des Hospitaux*. 1: 466.
17. Trousseau, A. (1861-1865) *Clinique medicale de l'Hotel Dieu Paris*. 1: 728.
18. Cruise, F.R. (1912) *In Twelve Catholic Men of Science*. ed. by Sir Bertram Windle. London.
19. Albutt, C. (1909) Chapter on Aortic Regurgitation. *Albutt's System*. 6: 458.
20. Watson, T. (1844) *Lectures on the Principles and Practice of Physics*. Philadelphia. p. 603.

## Further Papers on the History of Aortic Regurgitation

- Ferguson, W.F. Corrigan's Investigations on the cardiovascular system; an historical sketch. *Canada Lancet* (Toronto). 1917; 50: 205.
- Hale-White, W. Thomas Hodgkin *Guy's Hospital Reports*. 1924; 74: 117.
- Major, R.H. Raymond Vieussens and his treatise on the heart. *Annals of Medical History*. 1932; 4: 147.

Bramwell, E. Corrigan's Original Description of Aortic Regurgitation: A Reference to some matters of historical interest. *Edinburgh Medical Journal*. 1933; 40: 13.

- Flaxman, N. History of aortic incompetence. *Bulletin of History of Medicine*. 1939; 7: 192.
- Irvine, R.E. James Hope and the History of Aortic Regurgitation. *Guy's Hospital Reports*. 1957; 106: 1.
- Mulcahy, R. The Early Descriptions of Aortic Incompetence. *British Heart Journal*. 1962; 24: 633.