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KERLEY SE B-LYNE

Die sukses waarmee myterklep-operasies bekroon is, het 'n nuwe veld in hartnavorsing oopgestel, en in die afgelope 10 jaar is baie metodes uitgewerk en veel ondervinding opgedoen aangaande die bepaling van die geskiktheid van rumatiese pasiënte vir snykundige behandeling. Met behulp van hartkateters is opgawes van die bloeddruk binne die hart en groot bloedvate verkry; opgawes wat die radioloë in verband probeer bring het met die voorkoms van die longgebiede en die hart op hul plate van die borskas. Splinternuwe maatstawwe vir die berekening van die pasiënt se ‚opereerbaarheid' wat nog steeds deur verdere ondervinding gewysig word, is deur hierdie metode bereik. Een van hierdie ‚nuwe' tekens—horisontale en periferale lyne aan die longbodems—is vir die eerste maal in 1951[1] beskrywe deur die Londense radioloog, Peter Kerley, as 'n groep sekondêre strepe in die longgebiede, en hulle het sedertdien bekend geword as ‚Kerley se B-lyne'.

Kerley het gemeen dat hierdie strepe, wat later weer vervaag, limfkanale is waarvan die grootte bepaal word deur die mate van druk by die aar-end van die long-haarbloedvat. Gough[2] skryf die strepe toe aan die ophoping van weefselvloeistof in die tussenwande in die longblasies. Verskeie stukke navorsingswerk is reeds gedoen oor hoe hulle in verband staan met die druk binne die longe—aan die aar-end van die haarbloedvat (linkerkantse voorkamerdruk) aan die een kant, en die slagaar-end (longslagaardruk) aan die ander kant. Rossall en Gunning[3] het 100 gevalle van myterklepvernouing ondersoek, sowel as 16 verdere gevalle van drukverhoging in die longslagaar weens ander oorsake. Die gemiddelde linkervoorkamerdruk is volgens Allison en Linden[4] se metode gemeet; die gemiddelde slagaardruk in die longe is ook bereken—by wyse van bronchoskopie by die meeste van die myterklepgevalle en met behulp van hartkateters by die 16 gevalle van drukverhoging. Die teenwoordigheid van die dwarsstrepe en hul graad is onafhanklik bepaal deur 'n radioloog volgens 'n plaat wat binne 'n maand ná die drukopgawes vasgestel is, geneem is. Die uitslae het 'n duidelike verband tussen die teenwoordigheid van die lyne en 'n verhoogde kapillêre aardruk (linkervoorkamer) aangetoon—hoe hoër die druk, hoe skerper was die lyne afgebeeld. Rossall en Gunning glo inderdaad dat hierdie lyne altyd teenwoordig is wanneer die druk hoër as 24 mm. Hg is, d.w.s. meer as die kolloïed osmotiese druk van die plasmaproteïene (25 mm. Hg), wanneer vloeistof geneig is om in die tussenwande in die longblasies op te hoop en duidelik op X-straalplate afgebeeld word.[2] By die groep myterklepstenose-gevalle was daar nie so 'n duidelike korrelasie tussen die strepe en die kapillêre slagaardruk (longslagaar) nie, hoewel hulle altyd teenwoordig was waar die gemiddelde druk hoër as omtrent 50 mm. Hg was. Hierdie bevinding klop blykbaar met dié van die derde korrelasie, nl. tussen die strepe en longslagaardruk by die 16 gevalle wat slegs drukverhoging in die

EDITORIAL

KERLEY'S B LINES

The success of mitral valvotomy has uncovered a new field of cardiological research, and in the last 10 years many techniques have been developed and much experience gained in assessing the suitability of rheumatic patients for operation. Cardiac catheterization has contributed readings of the blood pressures within the heart and the great vessels, which radiologists have attempted to correlate with the appearances of the lung fields and the heart on their chest films. By this method novel criteria of operability have been reached that are still undergoing modification by experience. One of these 'new' signs—horizontal and peripherally placed lines at the lung bases—was first described by the London radiologist, Peter Kerley, in 1951[1] as a group of secondary lines in the lung fields, and they have since become known as 'Kerley's B lines'.

Kerley held that these transient lines are dilated lymphatic channels whose size depends on the degree of pressure at the venous end of the pulmonary capillary. Gough[2] has ascribed their presence to the accumulation of tissue fluid in the interalveolar septa of the lungs. The way in which they are related to the pulmonary pressures—to the venous end of the capillary (left auricular pressure) on the one hand, and to the arterial end (pulmonary arterial pressure) on the other—has been the subject of several investigations. Rossall and Gunning[3] examined 100 cases of mitral stenosis and 16 more cases of pulmonary hypertension arising from other causes. Mean left auricular pressures were measured by the method of Allison and Linden,[4] and also the mean pulmonary arterial pressure—in most of the mitral cases by bronchoscopy and in the 16 hypertensive cases by cardiac catheterization. The presence of the transverse lines and their degree was assessed independently by a radiologist from a film, usually one which was taken within a month of the pressure recordings. The results showed a clear correlation between the presence of lines and a raised capillary venous (left auricular) pressure—the higher the pressure the more marked the lines. In fact, Rossall and Gunning believe that the lines are invariably present if the pressure exceeds 24 mm. Hg, i.e. a level exceeding the colloid osmotic pressure of the plasma proteins (25 mm. Hg), when fluid tends to collect in the interalveolar septa and produce distinct radiological shadows.[2] Correlation between the lines and the capillary arterial (pulmonary artery) pressure was not so clear cut in the group of mitral stenotics, although above a mean pressure of about 50 mm. Hg they were constantly present. This finding appears to fit the conclusions of the third correlation, i.e. between the lines and pulmonary arterial pressure in the 16 cases showing pulmonary hypertension alone. In only 2 cases were doubtful lines present; in the remaining 14 the films were clear. It seems, therefore,

longe getoon het. Daar was slegs 2 gevalle waar die lyne twyfelagtig was; by die ander 14 was die plate duidelik. Dit blyk dus dat die teenwoordigheid van die lyne en hul graad van intensiteit afhang van die abnormale drukhoogte aan die linkerkant van die hart. Gunning en Rossall beskrywe hul vervlietende teenwoordigheid by 'n geval van linkerhartkamerversaking (wat volg op hartspier-infarksie) en vestig die aandag daarop dat ‚skerp' lyne (in teenstelling met ‚dowwe' of ‚middelmatige' lyne) blykbaar 'n volgehoue hoë linker-voorkamerdruk verg; iets wat by myterklepvernouing wel voorkom, maar nie dikwels by ander aandoenings nie.

Ander navorsers het tot min of meer dieselfde slotsom gekom aangaande die etiologie van hierdie lyne. Bruwer *et al.*,[5] wat hul verlaat het op drukopgawes verkry met hartkateters, het bevind dat die kapillêre aardruk die belangrikste faktor by hul veroorsaking is, en onlangs het Fleming en Simon[6] verslag gedoen oor 99 kateter-korrelasies by 88 pasiënte. Hoewel hul opsomming nie so uitgesproke en afdoende is as dié van Gunning en Rossall nie, weerspreek hulle mekaar in elk geval nie, en hul referaat is uiters belangrik insoverre dit die aandag vestig op onjuisthede of wanbegrippe insake die korreleer van radiologiese en hemodinamiese gegewens. Metode en liggaamshouding speel bv. 'n rol, asook die tussenpose tussen die drukopname en die neem van die borsplaat—hulle meen dat hierdie faktor daarvoor verantwoordelik was dat hulle nie 'n drukmaatstafsyfer kon bepaal waarbó die lyne altyd teenwoordig is nie. Al hierdie werkers stem egter saam dat wanneer Kerley se B-lyne teenwoordig is, die longaardruk hoog is en die graad van myterklepvernouing ernstig genoeg is om drastiese behandeling te regverdig—Gunning en Rossall beweer dat die druk ‚gevaarlik hoog is; . . . dit verdien vroeë oorweging van snykundige behandeling van die klep.'

that the presence and degree of intensity of the lines depends on the abnormal height of the venous pressure on the left side of the heart. Gunning and Rossall describe their transient presence in a case of left ventricular failure (following a myocardial infarct) and point out that 'marked' lines (as contrasted with 'poor' or 'moderate') appear to require a sustained high left auricular pressure, such as is unusual in disorders other than mitral disease.

Other workers have reached more or less the same conclusions on the aetiology of these lines. Bruwer *et al*,[5] relying upon pressures obtained at cardiac catheterization, found the capillary venous pressure to be the more important factor in their production, and recently Fleming and Simon[6] reported upon 99 catheterization-correlations in 88 patients. Whilst their conclusions are altogether more guarded than those of Gunning and Rossall, they are not contradictory, and their paper is invaluable in pointing out the fallacies of correlating radiological and haemodynamic data. Technique and posture play a part, for instance, and also the interval between the pressure readings and the chest film—a factor they believed responsible for their inability to find a critical numerical level of pressure above which the lines are always present. However, all these workers agree that when Kerley's B lines are present, the pulmonary venous pressure is high and the degree of mitral stenosis severe enough to warrant rigorous treatment—in the words of Gunning and Rossall, the pressure is 'dangerously high, warranting early consideration of . . . valvotomy'.

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3. Rossall, R. E. and Gunning, A. J. (1956): *Ibid.*, **1**, 604.
4. Allison, P. R. and Linden, R. (1955): *Ibid.*, **1**, 9.
5. Bruwer, A. J., Ellis, F. J. and Kirton, J. W. (1955): *Circulation*, **12**, 807.
6. Fleming, P. R. and Simon, M. (1958): J. Fac. Radiol., **9**, 33.