

# BOWDITCH. (V. Y.)

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## THE USE OF STROPHANTHUS HISPIDUS IN HEART DISEASE. ✓

BY VINCENT Y. BOWDITCH, M.D.

A LITTLE more than a year ago, Professor Fraser, of Edinburgh, published the results of fifteen years' experience with a drug, till then, all but unknown to the medical profession. The feeling of respect due to such an accurate observer and careful experimenter as Fraser; the experience of several of our New York associates, as well as the comparatively recent facts brought to my notice in our own community, are the reasons of my calling your attention, this evening, to the use of strophanthus in diseases of the heart.

In the *British Medical Journal* of November 14, 1885, one may find the full account of Fraser's experiments; and I will, therefore, only call your attention to a few of the most important characteristics of the drug, hoping thus to induce you to give it a careful trial in your own practice, if you have not already done so.

The plant is indigenous to Africa, and is used by the natives as a poison for arrow-heads. It is of the digitalis group, and has a distinct action upon striped muscular fibre, and also upon the heart; and, in poisonous doses, causes greatly increased and almost continuous cardiac systole, with consequent paralysis of the heart and early cadaveric rigidity.

By a series of experiments patiently carried out

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over a number of years, both clinically and in the laboratory, Fraser has arrived at the following conclusions :

*First.* That *strophanthus* has a distinct action, like *digitalis*, in increasing the force of systole, at the same time diminishing the rapidity of the heart's action, whether by stimulation of the organ, or direct action upon the heart muscle, he is not prepared to say.

*Second.* That it has little or no effect upon the bloodvessels ; and, therefore, causes less blood-tension than *digitalis*, which, either by vaso-motor influence or direct action, or both, causes a contraction of the vessels, with a consequent rise of blood-tension.

*Third.* That it causes less gastro-intestinal disturbance than *digitalis*.

*Fourth.* That it possesses, like *digitalis*, both anti-pyretic and diuretic properties.

*Fifth.* That, unlike *digitalis*, it is not cumulative in its effects ; and

*Sixth.* That it may be used in smaller doses than *digitalis*.

If Fraser's conclusions prove true in practice, we find a decided weight in the balance in favor of *strophanthus* ; and, although experience teaches us to be cautious in accepting the much-vaunted virtues of any new remedy, yet the facts brought to our notice by one of such eminence should make us unhesitatingly experiment for ourselves.

Fraser has used *strophanthus* in the form of a tincture, in doses varying from *three to twenty minims*, twice or three times daily ; but, in a recent article, he speaks of the dose as varying from five to ten minims. He has also experimented most successfully with the subcutaneous injection of the active principle, *strophanthin*, a glucoside, in doses of  $\frac{1}{50}$  of a grain ; and, by this means, has noticed much more lasting effects from

one dose than with the tincture. In one case, with severe symptoms from mitral regurgitation, the marked beneficial effect upon the heart's action by a single subcutaneous injection of  $\frac{1}{30}$  gr. of strophanthin was noticed for eight days.

In the *New York Medical Record* of December 18, 1886, among the "Transactions of the Practitioners' Society of New York," are reports of cases by Dr. C. L. Dana, the only ones yet made public, so far as I know, in America.

Dr. Dana's results, in a comparatively small number of cases, are such as to make him believe that strophanthus, as now used here, is a valuable addition to our pharmacopœia, and can be often used in cases where digitalis is not so efficacious.

The testimony of other observers seems to point towards the favorable action of strophanthus, some believing that, eventually, it will supersede digitalis in the treatment of heart disease.

My attention was especially called to the drug by a well-known lady physician of this city, who is enthusiastic over its action in her own case, and has kindly allowed me to quote her experience with it:

During the previous year, this lady, a sufferer from a mitral lesion, was very ill, in the south of France, with pneumonia, during the progress of which the heart became very troublesome. At the suggestion of her physician, during her convalescence she began taking strophanthus; and, before twenty-four hours had passed, experienced the greatest relief from the breathlessness upon the least exertion, which had been one of her most distressing symptoms. The improvement continued steadily, until, by the advice of a physician in another part of France, she ceased to take strophanthus, when the former symptoms returned. Repeated experiments have shown her conclusively that

the drug gives her great relief from dyspnœa, and its effects are always more pleasant than those of digitalis. In the use of the latter she had always experienced a depressing effect, coupled with gastric disturbance; with strophanthus, however, the effect is always rather exhilarating, and it has never caused the slightest trouble with the digestion. Its action is always markedly diuretic; and, although she has never taken it in doses sufficiently large to carry the pulse below the normal rate, it has always had a distinctly calming effect upon the heart. She continues to use the drug, omitting it at times for a few days, and always experiences the same sensations upon resuming it again. Her testimony, therefore, is distinctly in favor of strophanthus as a substitute for digitalis.

Acting upon these suggestions, I was, fortunately, able to try the drug in a case of severe heart disease, transferred to me by Dr. F. I. Knight, in which a slight mitral systolic murmur, great dilatation of the left ventricle, pulmonary œdema, a very rapid, irregular, intermittent pulse, and almost constant orthopnœa, were the chief symptoms. For several weeks, almost constant use of the tincture of digitalis, and trials of sparteine and caffeine, had failed to effect the action of the heart muscle, the pulse varying from 140 to 110 to the minute most of the time. Tincture of strophanthus, in doses of about three or four minims, three or four times a day, was tried; but, owing to some rather obscure symptoms, which I then thought might arise from the drug, it was discontinued after the third or fourth day; and although the patient insisted that she liked the medicine, and that she breathed more freely, I noticed no special action upon the heart or pulse.

Soon after this, the patient developed signs of congestion in the lower part of the left lung, namely, dul-

ness and slightly bronchial breathing; râles from rapidly increasing pulmonary œdema were heard on both sides; the legs, arms, and face were swollen, the dilatation of the heart increased and relief from great dyspnœa was obtained only by subcutaneous injections of morphine.

The husband of the patient having heard that Dr. M. L. Chamberlain of this city had had experience with strophanthus, suggested a consultation to which I gladly assented, and at his advice the strophanthus was again tried and gradually pushed. It was given finally in doses from fifteen to twenty-three drops by the ordinary glass dropper (about equivalent to ten or twelve minims) three or four times in the twenty-four hours; digitalin, in doses varying from gr.  $\frac{1}{100}$  to gr.  $\frac{1}{75}$ , being given between the doses of strophanthus when the patient was awake. It would be quite unfair to attribute all the gain which immediately followed to strophanthus, for although digitalis as used before in the tincture had not had the slightest apparent effect upon the pulse, yet the use of digitalin naturally makes it impossible to say which was the larger factor in the improved condition of the patient, but the following facts were noticed: rapid decrease of the dulness and bronchial breathing over the congested portion of the left lung, great diminution in the number of râles throughout the chest; the swelling of the arms and legs diminished, the dyspnœa was less marked; the action of the heart became much less feeble, while the pulse slowly dropped from 120 to 88, became perfectly regular and lost its intermittent character. This improvement continued for about a week, when a curious friction sound appeared near the angle of the left scapula, the exact nature of which it was impossible to determine, and that night, the patient while sitting up during a movement from the

bowels suddenly fell back and expired. No autopsy was allowed.

*Synopsis of case.*— Patient suffering intensely in the last stages of mitral disease, after receiving no apparent benefit from the tincture of digitalis, sparteine or caffeine, obtains very great relief from somewhat large doses of tincture of strophanthus alternating with digitalin.

Another case in which I have noticed a markedly beneficial effect from strophanthus is a lady sixty-three years of age, for years a sufferer from valvular disease in which dyspnœa and great irregularity of the heart's action are the chief symptoms. During a severe illness last November, from which I never expected her to recover, all the most serious symptoms were greatly relieved by three or four minims of strophanthus given three times a day. General œdema of the legs disappeared; the action of the heart and pulse steadily improved and the latter, which by the use of digitalis had fallen to about 45, rose again to about 60, and although occasionally intermittent was more regular than I had ever known it under the previous use of digitalis. The patient is now vastly improved in health, moves about the house, is able to go out to drive or walk, and still takes about three minims of the strophanthus three times a day, and although the pulse still intermits and is somewhat irregular, the action of the heart is much less tumultuous than before, and varies from 65 to 80 beats in the minute.

The last case in which I have used the drug is a man about fifty-eight years of age, who has had symptoms which point to fatty degeneration of the heart, namely, a weak, rather irregular and rapid pulse with occasional attacks of faintness. This patient seems not at all sensitive to the drug, and I have gradually

increased the dose to fifteen minims, four times in the twenty-four hours. Although the pulse has never fallen below 86 and usually is about 94 or 96 to the minute, it is now of very good strength and perfectly regular ever since he began to take the tincture about five or six weeks ago. Previously the pulse had often been above 100, and at times very weak. The general condition has slowly improved; there has been no recurrence of the attacks of faintness, and as the patient tells me he has always had a rapid pulse I have not attempted to reduce its action farther, and am at present diminishing the dose again to see how far the drug has a controlling action upon his heart.

From such a meagre array of cases I should, of course, be unjustified in making any remarkable claims for the drug, but the experience of others combined with the results of my own observation, makes me feel it should be brought before the profession and tested.

As to the preparations now in use in this country, I only know of the tincture and the soluble triturate tablets as prepared by Fraser & Co., of New York, in which one tablet represents one minim of the tincture.

I have reasons for believing that the tinctures which I have thus far tried, made by some of our best-known firms here, are not yet of as good a quality as those prepared by Prof. Fraser or by Messrs. Duncan and Flockhart, of Edinburgh.

Through the kindness of the lady-physician already referred to, I have seen the Edinburgh preparation, and instead of having a greenish hue, it is colorless, has a slight but distinct odor of sulphuric ether, leaves no precipitate when added to water, and has a less bitter taste than these tinctures which I have seen here.

I can but think, moreover, that our present prepa-

rations vary in their strength ; a fact which makes thorough experimentation much more difficult, but by keeping in mind the same general principles which guide us in the use of digitalis, chiefly watching the character of the pulse, we shall be enabled to test the comparative value of strophanthus, with little danger of doing harm.

It is to be hoped that before long we can make experiments with the active principle strophanthin which Fraser tells us is a much more efficacious method of administering the drug than any other.

Increased facilities for obtaining the plant from Africa will doubtless before many months not only enable our druggists to give us this form of strophanthus, but at a greatly reduced price.

#### REFERENCES.

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#### DISCUSSION.

[Specimens of the tincture from different manufacturers were passed about, to show the marked difference in their appearance.]

DR. F. I. KNIGHT said that this is a drug that can be more easily tested than some others, because it either has or has not certain definite qualities, the presence or absence of which can be discovered by experiment. Even if it prove to be no better or even



not quite so good as digitalis, it is still very useful to have an additional drug for use when that, for any reason, cannot be employed. If it shall prove possible to separate its active principle, so that it can be used subcutaneously and with certainty in cases of heart failure, where we now use ammonia, it will be a great boon.

He had personally used strophanthus in a few cases, and it seems to act promptly and efficiently; but his experience with it is not yet sufficiently large to warrant a definite opinion.

It was proper to say that some of the specimens for sale in this city have been poor ones.

DR. F. C. SHATTUCK said that he had been much impressed by Prof. Fraser's paper on strophanthus and had, immediately after reading it, asked Mr. Metcalf to send for some of the drug. Since its reception he had employed it in six or eight cases, but has not as yet been able to come to definite conclusions as to its merits. In one case he thought he had got toxic effects from it; in two others the drug had seemed useless, perhaps because the dose was not sufficiently pushed. The tinctures of different manufacturers seem at present to differ in strength, which makes it more difficult to carry out satisfactory experiments. The case was mentioned of a little girl of ten, with mitral disease, now under treatment. Several weeks ago, while almost absolute rest was being maintained, the symptoms grew gradually worse, cyanosis increased, moderate external and internal dropsy appeared, the jugulars and the liver pulsated, the stomach rejected everything, the urine fell from ten to two ounces per diem. About eight ounces of blood were withdrawn by leeches over the liver, and that night the child slept well, the next morning eat a large breakfast, and the urine increased to ten ounces. Two

days after the leeching two minims of the tincture of strophanthus were ordered thrice daily, and in the next twenty-four hours the child passed more than 120 ounces of urine. It is not easy to say how much of this is attributable to the drug, how much to the leeching. The drug was soon omitted, but has lately been resumed and gradually increased to six minims thrice daily, without the slightest apparent effect on the pulse. In another case similar results were obtained. Both of these form part of a series which will be reported to the Society at a later meeting in illustration of another point in cardiac therapeutics. To reach definite conclusions with regard to the value of a new drug, time and the teachings of a large number of carefully observed cases are required. Such careful trial strophanthus certainly merits, and the speaker rejoiced that Dr. Bowditch had brought forward the subject.

DR. H. I. BOWDITCH had given strophanthus in a case of old mitral regurgitation with enlarged area of cardiac dulness, dyspnoea and weak irregular pulse. An obstruction murmur had recently appeared. The patient had steadily improved since this drug was used, there having been slight improvement twenty-four hours earlier. There is now a simple regurgitant murmur and the apex which was without, is now within the nipple. He had also employed it in a case of rheumatism with cardiac lesions and great dyspnoea. This patient was extremely ill and died in four days without relief. The drug in this case came from a supply which was said by one of the previous speakers to be poor. With his present knowledge he should use it if digitalis failed.

DR. F. H. WILLIAMS said that the work done by Prof. Fraser on strophanthin deserves respectful attention, as he is one of the few experimenters who have

studied this drug, both from the physiological and the clinical side.

In strophanthin we have undoubtedly a very valuable substitute for digitalis and a much more active substance.

Dr. Logan, of Liverpool, has suggested that the marked and prompt results obtained by the use of strophanthus are probably due to its great strength, and he has been able to get a similar action from digitalis by using it in large doses, m. x every hour for eighteen to forty-eight hours.

