Automatic Control of the Coronary Suction Pump

Martin Hargrove
Cardiothoracic Surgery Unit
Cork Regional Hospital
Wilton, Cork, Eire

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Abstract

***(J. Extra-Corpor. Tech.* 18[4] p.219-220 Winter 1986) A coronary suction device is described which affords the surgeon direct control of blood aspiration. The device described is nondisposable and can be made up from extra level sensors. With use of the device, there was a reduction in the time that coronary sucker pumps were used, hence reducing the aspiration of air. As the coronary sucker pump causes most trauma to blood, any reduction in suction time will reduce red cell damage.**

Introduction

Having changed from bubble to membrane oxygenators, we had at our disposal a number of redundant level sensors. These devices, with some modification, make an ideal foot switch for use by the surgeon when coronary suction is required. While the perfusionist normally controls the duration and quantity of suction, it is not always possible to have direct vision of the operating field. This results in the coronary pump running for longer than required. With the assistant surgeon in control, coronary suction is lessened and resultant blood trauma is reduced.

Materials and Methods

The Cobe Stockert[a] low level sensor for the Cobe Optiflo II consists of two parts, the control (Figure 1)

Direct communications to: Martin Hargrove, Cardiothoracic Surgery Unit, Cork Regional Hospital, Wilton, Cork, Eire

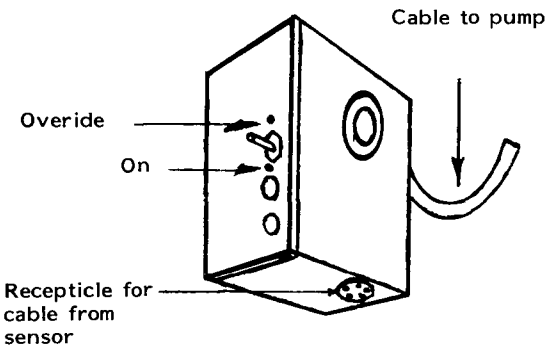

Figure 1

and the sensor (Figure 2). The sensor emits a pulsed light beam which when interrupted allows the pump to rotate. In normal operation the light beam is directed through a blood level in the oxygenator. However, if a suitable opaque material is introduced into the light beam, the pump will also rotate. If a foot switch is constructed as shown in Figure 3, on depression of the foot switch the pump rotates; when it is released, the

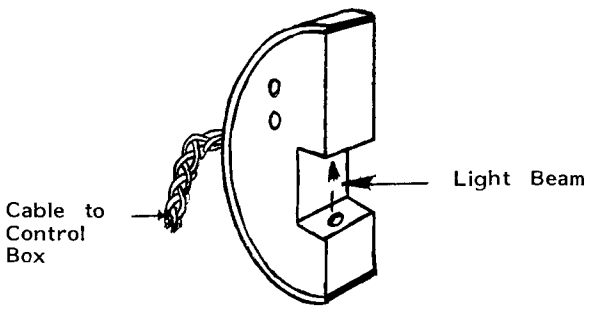

Figure 2

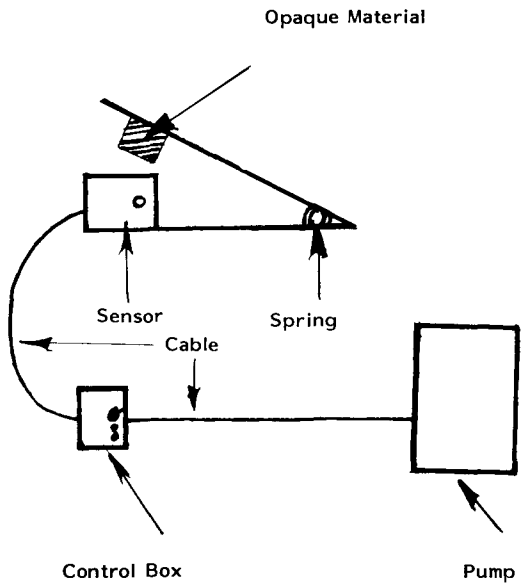

Figure 3

light beam is reestablished, stopping the pump. As the light beam is pulsed external light does not affect its operation.

The control box of the level sensor (Figure 1) contains an override switch which can be used both to set the pump speed, before foot operation, or to reestablish perfusionist control of the suction if the assistant surgeon is unavailable to operate it.

Discussion

With the current emphasis on decreasing blood cell trauma, as evidenced by the increasing use of membrane oxygenators, all potential sources of blood cell trauma must be dealt with. As coronary suction is considered to be responsible for the bulk of red cell damage, it should be used only when required.[1] That is imperative. Although manufacturers are now producing disposable coronary suction cannulae with built in on-off switches, the above system is an inexpensive, non-disposable, and effective alternative.

In our experience, coronary suction without this device resulted in the pump being run for 20 minutes per hour of bypass. Use of the above system reduced that time to 15 minutes. This represents a 25% decrease of running time. Other light sender, capacitance, or ultrasonic blood level sensors may be adapted similarly.

References

1. Wright, G: *Haematological Effects of Cardiotomy Suction. Towards Safer Cardiac Surgery, Longmore, D.B.* (Ed), Lancaster, England: M.T.P. Press Ltd., 1980, pp 313-322.