rather than vascular, is yet to be discovered, and these discoveries will lie in the hands of neurosurgeons who have learnt the appropriate microvascular skills.

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On-demand analgesia equipment

SIR,—The recent paper by Dr W D White and others (21 July, p 166) concerning on-demand analgesia using a Janssen (JS10299) demand analgesia computer prompts us to comment on other equipment available for this purpose. Following an earlier paper describing a patient-controlled system for pain-relief during labour¹ we purchased the commercially available equipment—a Cardiff Palliator manufactured by Pye Dynamics Ltd. After extensive experience in the labour ward we concluded that there were three major design deficiencies with regard to patient management and safety.

Firstly, the dose of analgesic administered to the patient on demand is controlled by a three-place thumbwheel digital switch variable from 0 to 999 mg. This is accessible to anyone who can touch the machine. Since "if there is a button to be pressed, someone will press it" a safeguard was needed. Our choice of analgesic agent was diamorphine, as plasma concentrations achieved could be measured by immunoassay; the dose was 3 mg; and a change of only one space on the control—that is, from 003 to 013 mg—could have had serious consequences. We have placed a simple Perspex shield with three vertical slits over the whole switch. The settings can now be altered only by inserting a narrow metal peg kept with the machine. An equally important point is that the total dose indicator is reset by a simple push button below the dials. As this gives the only indication of how much drug the patient has received in the course of labour, any accidental resetting would wipe out the only record available. This button has been cut flush to the surface and resetting can be achieved only by using the metal peg. From the photograph available it appears that similar thumbwheel settings are used on the Janssen machine. What are the safeguards?

Secondly, there is no way of programming our machine so that a maximum total dose is not exceeded. The amount the patient is given per demand is dialled in, as is the time interval between demands. However, in a prolonged labour the patient could go on making repeated demands until the syringe is empty. If the syringe is refilled, the patient can make further demands. An added safeguard whereby a maximum permitted dose could not be exceeded was, in our opinion, vital. A small unit was designed by IRC; this has a two-place thumbwheel switch into which the maximum dose desired is dialled. Again the safety shield necessitates the use of the metal peg for setting. Once this preset total dose has been reached the syringe is halted and will continue to be used only if a larger dose is then dialled in. While the Janssen machine can apparently be set to a maximum dose delivered in any hour, can a maximum total dose also be set?

Thirdly, a successful demand for analgesia by the patient is indicated by a demand light coming on. This will continue to show until the minimum time interval dialled into the

machine is reached. For example, if the machine is set so that the patient can obtain only one dose of analgesic agent in 20 minutes then the light will show for this interval. However, an observer entering the labour room and seeing the light on does not know if it has been on for one minute or 19 minutes. Similarly, when the light is off it is not possible to know, other than by the patient's memory, whether it has been off for a minute or an hour. Such clinically useful information should be available—for example, a patient approaching full dilatation or requiring a general anaesthetic. We have designed an electronic timer unit with three digital displays. The first indicates total elapsed time from the first demand for analgesia, the second displays the time interval since the last demand, and the third gives the time interval of the demand before that. For women in labour these more detailed data are necessary for patient management. The Janssen machine apparently provides a printer, and this is a reasonable alternative. However, printers are prone to mechanical failure and usually more expensive to buy. How is information obtained if the printer fails?

When new equipment is described for patient care it would be useful, especially if it is to be patient controlled, if the authors would give comprehensive details of the equipment and their opinion on its suitability for the task it is claimed to do. In our opinion the commercial equipment we purchased had some deficiencies which we have corrected. However, the time and effort needed were considerable and we would hope to pass on these benefits to other users. The Janssen equipment may have got over some of these difficulties but it would be nice to be certain. And at what cost?

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¹ Evans, J M, *et al*, *Lancet*, 1976, **1**, 17.

Splenectomy for massive splenomegaly

SIR,—We would like to comment and expand on some of the statements in your leading article (4 August, p 293). Massive splenomegaly is encountered as part of the clinical picture in a number of diseases as indicated, but it may in addition be the only presenting manifestation without the usual accompanying signs of the underlying disease. Recently we have seen two patients who complained only of abdominal pain and who had splenomegaly at least 16 cm below the costal margin. Neither had lymphadenopathy or other abnormalities on physical examination; chest radiographs were normal. Bone marrow biopsy revealed the microscopical appearances of Hodgkin's disease in one case and of non-Hodgkin's lymphoma in the other.

Plain abdominal radiographs, radionuclide scans, and ultrasound can confirm the diagnosis of splenomegaly but occasionally may give misleading results. In a recent case which we have seen, the spleen was thought to extend 17 cm below the costal margin; the appearances of massive splenomegaly were shown by each of these investigations. However, laparoscopy, an investigation you do not mention, revealed the organ to be the enlarged

left lobe of liver; subsequent histology showed cirrhosis. The spleen did not extend below the costal margin.

No mention is made of the use of radioisotope studies to determine the sites of red cell destruction and of extramedullary erythropoiesis in attempting to predict the value of splenectomy in patients with myelofibrosis. In a few such patients radiotherapy to the spleen can be beneficial, particularly when the patient is not fit for or refuses splenectomy; it does not preclude splenectomy at a later date.

In the final paragraph some complications of splenectomy are mentioned, but it is not clear that some of the comments refer to splenectomy in general while others refer to the complications of removing a massive spleen. Splenectomy for staging in Hodgkin's disease carries a mortality of less than 0.5%, rather than 15%.¹

Postsplenectomy thrombocytosis may be marked in degree and persistent for months or years; but the potential thrombotic complications depend on a number of factors, and few of these are defined at present. We have observed the changes in the platelet count after staging splenectomy in 25 patients with Hodgkin's disease. Thrombocytosis reached a maximum in the second week after splenectomy and subsided in one to two months, and in no case did the count exceed $1000 \times 10^9/l$. Thrombotic complications were not seen and anticoagulants were not given. In one series of 318 patients undergoing splenectomy for conditions other than myeloproliferative disease, postoperative thrombocytosis was not associated with a significantly increased risk of thromboembolism.² Hirsh and Dacie³ showed that the occurrence of severe postsplenectomy thrombocytosis depended on whether or not the patient remained anaemic after operation. It is clear that the complications and risks of splenectomy vary with the underlying disorder as well as with the size of the spleen.

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¹ Miller, J B, and Ultmann, J E, in *Hodgkin's Disease*, ed M J Lacher, p 44. New York, Wiley, 1976.

² Boxer, M A, Braun, J, and Ellman, L, *Archives of Surgery*, 1978, **113**, 808.

³ Hirsh, J, and Dacie, J V, *British Journal of Haematology*, 1966, **12**, 44.

SIR,—Your leading article (4 August, p 293) on splenectomy for massive splenomegaly presents a somewhat superficial view of this not uncommon clinical problem. In recent years many of the effects of the "big spleen" syndrome have been well described and it is now necessary to define more specifically those haematological problems which provide convincing evidence for splenectomy. For example, the anaemia associated with splenomegaly may be due to a combination of splenic red cell pooling, splenic haemolysis, and plasma volume expansion, mechanisms that can be assessed by isotopic techniques in most large hospitals. Surely the concept of hypersplenism, useful as it was 30 years ago, has now been replaced by a better understanding of many of the physiological and pathological results of splenic enlargement.

All would agree that while the haematological changes provide the strongest indications for splenectomy there are also powerful reasons for removing the very large spleen when it has become an intolerable and cumber-