New Inventions

Semi-automated Closed-circuit Bladder Wash-out Pump

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Dr. J. A. BUSHMAN, consultant anaesthetist, and Mr. S. ASKILL, of the Research Department of Anaesthetics, Royal College of Surgeons of England, London, and Mr. D. WALLACE, of the Shaftesbury Hospital, London, write: A pump has been constructed as a possible solution to a problem posed by one of us (D.W.)—namely, to produce a device which would wash out the bladder after prostatectomy without breaking the closed drainage system (which could result in an infection) and which could be used by relatively unskilled staff.

The pump with its associated valves is composed of only two parts—a piston and a cylinder (figs. 1 and 2). The piston has two functions, which are divided between its upper and lower halves. The lower half of the piston is grooved and the relation between this groove and the ports in the cylinder wall determines the source and destination of fluids entering and leaving the cylinder. A peg in the cylinder wall engages in another set of grooves cut in the upper half of the piston. This engagement

allows only certain movements of the piston relative to the cylinder, so that the order of pumping movements and direction of fluid movement in and out of the cylinder are predetermined. The top of the piston is in the form of a combined handle and pointer to indicate the function of the pump in that particular position.

FIG. 1—Photograph of pump showing white Polytetrafluoroethylene piston in clear Perspex cylinder. Note grooves cut in upper half of piston channels drilled in body of pump.

FIG. 2—Right: Groove in piston is shown opposite two ports in cylinder. Left: Diagram of "gate" cut in upper half of piston which is engaged by peg in wall of cylinder, thus limiting its movement.

FIG. 3—Diagram of piston and cylinder. Port A is connected to bag under bed, port B to bladder, and port C to bottle of saline. Between strokes piston is rotated in clockwise direction.

In operation the pump is connected to the patient's bladder (B), to a bag under the bed (A), and to a bottle of normal saline over the bed (C) (fig. 3). In the piston's normal or resting position the urine from the bladder will run directly into the bag under the bed along the groove in the piston. In the event of the catheter becoming blocked the pump handle is rotated clockwise through 90 degrees. This links up the groove in the piston with the port in the cylinder connected to the bottle over the bed. The piston is then withdrawn to its limit, thus filling the cylinder with saline. When the handle is rotated through a further 90 degrees the contents of the cylinder are connected to the bladder into which they are emptied when the piston is pushed into the cylinder. In this position only one movement is allowed by the location of the peg in the piston, and this is upwards, withdrawing fluid from the bladder. A further rotation of 90 degrees brings the groove in the piston next to port A, into which the contents of the cylinder can then be pumped. The final rotation

of the handle through 90 degrees brings the piston back to its starting point, the groove joining port B to port A.

No internal dimension within the pump is less than $\frac{1}{4}$ in (6 mm) in diameter and this appears to be adequate to prevent blockage by blood clots. The pump has been used successfully on patients and the nursing staff find the sequence of operations easy to follow, as the pump allows only one movement from a given position. The pump can break up quite large clots and eject them into the drainage bag. Because any fluid used to wash out the bladder is "metered" into the drainage bag urine output is easy to calculate.

The piston of the prototype pump was made from polytetrafluoroethylene and the cylinder was made from Perspex. The device has been sterilized in glutaraldehyde (Cidex) as the present materials do not withstand autoclaving. The possibility of making the pump out of stainless steel in a form which will allow it to be taken apart for cleaning and autoclaving is being investigated.

Medicine in Old Age

Dementia in the Elderly: Diagnosis and Assessment

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Few patients are so taxing to doctors as the confused and demented. No other condition generates so much crisis, irritability, and interprofessional friction. Dementia is common: about 10% of old people are demented, half of them severely, and in the over-80s this proportion rises to more than one in five. Most are women, because among the very old women outnumber men by over two to one. There will be even more old people with dementia as the number of old people, and particularly the very old, continues to increase.

Until recently virtually no doctors took any interest in dementia, with a few outstanding exceptions. Yet an average general practitioner's list is likely to contain about 30-40 demented patients, and every general practitioner knows that the demands that many of these patients will make are out of proportion to their numbers, not least because their problems often present as crises.

It is not difficult to see why the "psychogeriatric crisis" is so common; one reason is that dementia heads the list of important conditions among elderly patients at home of which their general practitioners are likely to be unaware. Williamson and his colleagues in Edinburgh found that over 80% of moderately or severely demented old people were not known to be so to their general practitioners. Since these patients only very rarely seek medical help for themselves, not surprisingly they produce crises when their disabilities impinge on others or are "unmasked" by the death of a spouse, or the marriage of a daughter. Preventive measures must be based on the general-practice team, but the high rate of admission of old people to hospital

means that every admission gives an important opportunity for screening the patient's mental function.

What is Dementia?

Dementia in the elderly is a global disruption of personality, affecting behaviour and intelligence, with impairment of the ability to learn new responses—and thus to adapt to a changing environment. The emotional response is disorganized and blunted, and, most striking of all, there is loss of the ability to remember recent events. Often an astonishing degree of function may be preserved, provided the old person retains a constant environment with which she is familiar and that new demands on her are not great. Even so, such preservation is always precarious, depending on a constancy and security which are unlikely to last for long.

SENILE AND ARTERIOSCLEROTIC DEMENTIA

Dementia is of two main types, senile and arteriosclerotic. In the former there is degeneration of the parenchymatous tissue of the brain, the rate of which is mainly determined genetically. In the latter the brain substance degenerates as the result of impaired blood supply, with disseminated softenings due to infarction. In senile dementia the surface of the brain shrinks, the sulci are widened, and the ventricles dilated; most commonly, the parietal lobes are particularly affected. The pathological process in senile dementia is the same as that in Alzheimer's presenile dementia, the difference between "presenile" and "senile" Alzheimer's dementia being the genetically determined early onset and more rapid progression of the former. Other rare types of presenile dementia include Pick's disease (affecting chiefly the frontal lobes), Jakob-Creutzfeldt disease (which usually runs a very rapid course), and Huntington's chorea (with an autosomal dominant inheritance, the gross

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