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Non-Catheter simple non-invasive bladder draining method with no costs

M.G. Hocking

Professor of Materials Chemistry, University of London, UK

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Abstract

A simple, cost-free rapid method is described for non-invasive non-catheter draining of urine from the bladder. There is no entry of infection and the method is of interest to men with incomplete or no bladder emptying due to poor detrusor function, and also to those with a large bladder diverticulum.

This method is based on self-assisted postural drainage. Carefully graded pressure, kneeling forward, torso horizontal and supported

by a 12-inch square kitchen stool-top, gave passive low-pressure voiding. If the abdominal contents are similar to a non-elastic viscous fluid, external applied pressure is distributed everywhere uniformly (isostatic) and so will be equal both inside and outside the bladder, and both inside and outside the ureters connected between it and the kidneys. Even otherwise, calculations show that the pressure inside the bladder is normally less than would cause upper tract damage. A low starting force avoided any upper tract damage (i.e. ureter dilation, and possible refluxing back into the kidney).

An initial partial pre-emptying by normal urination was done. A final stage used a simple plastic horseshoe or semi-circle shape. Average residual bladder volumes: 43 mL.

The method was tested twice daily for seven years on one patient with low pressure chronic retention, and was found successful, with no infections, or adverse effects, and no catheters were ever used.

Key words: Crede, diverticulum, no catheter, without catheter, TURP, urine retention, prostate enlargement

Introduction

This paper follows a previous brief report [1] and adds much more detail.

Frequently after a prostate removal operation (see below), the bladder cannot be emptied because the detrusor (bladder-squeezing muscle) had been permanently over-stretched due to chronic bladder outflow blockage due to an enlarged prostate over the preceding months/years. Using a catheter twice daily is uncomfortable and can introduce infection into the bladder, requiring antibiotics to remove. The bladder contents are (and should be) sterile.

The detrusor hypofunction (reduced bladder emptying ability) in the case described here, was due to an unrecognized (by the patient) chronic urine retention, prior to an eventual TURP operation (endoscopic sub-total prostatectomy) to "core out" the restriction caused by an enlarged prostate. Unfortunately the gradual (chronic) blocking of the urethral outflow over many months, due to an enlarging prostate, until outflow ceased completely, caused ballooning-out of a diverticulum from the wall of the over-distended bladder. The condition then became acute, as the kidneys could not empty into the over-full bladder and kidney damage could then become possible unless an emergency catheterization is performed to empty the bladder. The bladder had caused observable distension of the lower torso, but the patient did not recognize it as a serious situation until urine outflow ceased.

It may assist others to interpret the early symptoms, to give the above sequence in more detail. For several months the subject had noticed a slowly increasing girth but incorrectly assumed that he was just putting on weight. Then, over many weeks, the amount of urine expelled gradually became less: a "chronic" condition. When these two factors became serious enough for a doctor's opinion, especially that the volume expelled in a typical urination had become only about 20 ml, the doctor mistakenly prescribed some tablets and told the subject to drink plenty of water. This was not his usual doctor, who was away. But this was the exact opposite of what should have been advised! (The subject was unsure what the tablets were, but they were not related at all to his condition, which was actually an enlarged prostate causing an outflow obstruction.)

The subject then went off on holiday, but soon stopped "drinking plenty of water" when he realised his urine volume expelled was not improving. His girth was then much greater and he could not lie down to sleep and felt "unwell". After 2 days he felt so unwell that he had to stand upright all night, and the urine expelled was only about 10 ml per attempt. He then returned home and saw another doctor (again not his usual doctor) who spread his hand over the expanded umbilicus region and tapped it with the fingers of his other hand, and thereby deduced that his bladder was over-full and had risen to this high position! Instead of advising him to go immediately to A & E (hospital Accident & Emergency Department) for an emergency catheterization, the doctor said he should go the next day to see a urology consultant. (The condition had changed from "chronic" to "acute".)

This over-full bladder meant that the kidneys could not discharge any urine into the bladder, a serious condition which could lead to irreversible kidney damage. On visiting the urologist the next morning, a catheterisation drained out two and a half litres of urine! (A normal full bladder holds about half a litre.) The earlier "chronic" stage had caused (over many weeks) a diverticulum to balloon out behind the bladder (seen in the ultrasound pictures in the Indian J. Urology paper [1]). A blood test after the catheterization showed that the kidneys were 'deranged' (the term used), but fortunately subsequent blood tests, now done annually, showed normal kidney function had returned and remained normal over the 13 years since the TURP operation. (No prostate cancer was involved, only a slow prostate enlargement.) Over the next 13 years, there was negligible change in the flowrate during urination, but in a few cases a prostate can re-enlarge over a decade and cause an obstruction to flowrate again.

The above sequence of symptoms and events is not cautioned against in popular health books which the author has seen, which is why it is given above in detail, including the possibility of creation of a permanent diverticulum, and possible kidney damage.

There was never any urinary tract infection (UTI) during the 7 years of using the method described here, but prior to using the method there were several UTI episodes caused by use of conventional catheters, which required antibiotics to cure. Information from several General Medical Practitioners is that recurring infections from continual catheter use are a root cause of the eventual premature demise of some patients, so a method of complete avoidance of infections is of great importance.

The classic Crede maneuver alone (discussed later), may give a pressure which is too high, and it requires considerable strength to apply. But the method described below is entirely passive and requires no strength to apply.

CAUTION: It is important not to deliver a pressure higher than a normal detrusor muscle would reach, but the graded method described here easily achieved this aim, for a person of normal weight and build (i.e. with a normal Body Mass Index, BMI). It **must not**, of course, be used to overcome an obstructed urethra (e.g. caused by an enlarged prostate, or by a defective urethral sphincter or a stricture). The method is unsuitable for some neuropaths with an outlet obstruction and full medical advice is necessary, as pressure could be transmitted up to the kidneys. Prostate re-enlargement may cause an obstruction to recur, in a few cases, about 10 years after a TURP operation for an enlarged prostate. This was monitored annually by measuring the outflow rate with a beaker & stopwatch, in the same conditions (not soon after a meal; after drinking to fill the bladder).

Aortic Aneurisms: The method must not be used if the main blood vessel to the lower half of the body is over about 2.5 cm in diameter. This artery runs from the heart to the umbilical region, where it divides. A quick ultrasound scan (non-invasive) can easily measure its diameter along the region below the rib-cage down to the umbilicus. In using the bladder draining method described in this paper, no pressure was used above the umbilicus, to avoid restricting blood flow through this artery, which could cause a pressure rise. If this artery is over about 2.5 cm diameter, there is a risk of an aortic aneurism, where it balloons out and can burst – a cause of death of about 7000 men in the UK annually. See www.bbc.co.uk/news/health-20494032

The draining method below **must not** be used if the bladder is over-distended due to inability to urinate -- it was found essential to first do the procedures described in the **Procedures: Preliminary** section, below.

(See General Notes on the drainage procedure, below.)

For 'first use', there was a "psychological obstruction" due to a (commonly held) long-standing mental inability/inhibition to open the urethral sphincter while lying horizontal, and so first-use was with a bladder not more than two-thirds full and with the hands supporting some of the body weight. (A two-thirds-full bladder was first obtained by the hand-pressure method described below in the "**Procedures: Preliminary**" section.) When this traditional mental blockage/inhibition was overcome, after less than a week, it was found that the method worked very well.

Note for any patients who may be reading this paper: The methods described must be fully discussed with your doctor before trying them, and should not be construed as medical claims, or advice, and are only a description of a method that has been found to work. It is not implied that they will work for everyone, nor that they are recommended for use in any particular case. Pain is a definite contra-indication. There should be no pain felt when using this method. However, pain may simply indicate a temporary obstruction which may be caused by a too-full colon; in this case, the bowels should be emptied before trying again. If pain is caused by a too-full colon, the method should not be used until the bowels are emptied. Absence of pain does not necessarily mean that there is no obstruction.

Also, the method should not be done until several hours after a meal, as the stomach contents may be pushed upwards, but when this caution was followed there was no problem with such an occurrence. Only twice in the whole 7-year test was a slight taste of stomach acid noticed in the mouth, but this would be a contra-indication if occurring more frequently, as this acid can damage the esophagus. An immediate drink was taken.

Important: If any bladder-region operations have been performed, including a TURP, it is of course essential to seek medical advice before using this method, in case pressure may re-open an old surgical cut. For information, the patient described in this paper started using the draining method described here four years after a TURP operation for an enlarged prostate, but the 4-year delay was due only to the time taken in inventing and developing the method described here and does not imply at all that a 4-year wait is needed; medical advice is needed on this point.

No responsibility is accepted for any adverse consequences that may arise from copying this method. It is a description of what has

been done very successfully for a patient, but must not be taken as a recommendation to use it in a particular case.

Methods

Two very similar methods were developed:

Method (a) -- requiring a bed and 2 flat-top kitchen stools or a miniature table,

or

Method (b) -- requiring only 2 flat-top kitchen stools or a miniature table. See Fig. 1 in reference [1].

Method (b) is more convenient & needs less room.

As the methods are very similar, the choice of method was personal preference.

The kitchen stool method (b) would be unsuitable for unaided infirm subjects if they are unable to get up without risk of their hands slipping off the stool edges thus causing a fall-back onto the stool. Method (a) could be suitable if assistance were available.

The subject involved in this report was of normal BMI, average height, and able-bodied, and so he chose the more convenient method (b) – not requiring a bed.

Method (a) was developed first, and used for several months. Then Method (b) was developed and was the one finally used, as it requires less space and needs only two kitchen stools and no bed. After several months of use, gaining experience, it was finally simplified, as explained at the end of the Methods section.

The method chosen, was used **twice daily**, first thing in the morning and last thing at night. Hand-pressure-assisted urinations were done at other times during the day, as explained below in "Procedures: Preliminary". See Appendix 1, Note (viii).

Items required:

A 1 litre plastic beaker was required, of about 4½ inches top diameter. See Appendix 2.

For the kitchen stools/table method (b), a simple slightly sloping kneeling-platform covered with a folded towel (7 inches high at front, 14 inches deep and 6 inches high at the back) was required, placed about 7 inches from the table legs (or the stool legs). This is shown in Figures 3 & 4. The kitchen stools were padded, or, if solid wood, were topped with folded-up bath-towels.

Procedures:

Preliminary: Before starting these procedures, a normal urination was done (assisted if necessary -- see just below) and then (very advantageously) an egestion (emptying the bowels) was done and then another normal urination was done (hand-pressure-assisted if necessary – see just below), as it is desirable to avoid causing a higher-than-needed pressure at any stage.

Important: This preliminary urination step was never omitted, as the method described later below should not be done for an over-full (over-distended) bladder.

Hand-pressure-assisted method: Standing upright, placing the heel of the thumb on the supra-pubic area, clasping the other hand around the other edge of that hand, a moderate pressure was applied to assist this preliminary urination stage. It may be useful to repeat this procedure after a wait of about 5 minutes. If the bladder was so full as to visibly distend the abdomen, this preliminary procedure was very important before proceeding to Stage 1 below.

Important: If the preliminary stage above produced no flow, this may indicate an obstruction and medical advice would be necessary before proceeding further.

Some people cannot voluntarily urinate at all if their detrusor has been completely stretched (damaged). The above method should still be possible.

It was found essential never to omit the above preliminary stage nor to omit Stage 1 in the procedure below, to avoid an excessive initial pressure.

Precaution before each Stage: When the bodyweight was first gently lowered onto the stools for Stage 1 (see below), the arms were used (hands on the floor) to prop up the body weight until the urethral sphincter opened and flow started, and then the hands were gradually removed from the floor.

Important 'first-time use' precaution: At the 'first time used' outset, it was desirable for the subject to have no more than about a two-thirds-full bladder, in case the unusual horizontal position acts as a "psychological obstruction" preventing the urethral sphincter from opening. After a few days, this "two-thirds-full" precaution was no longer needed (but the "Preliminary" procedure above was always used), as the method became familiar. Everyone has a long-standing mental inhibition against urinating when lying horizontal, and so for the first few sessions it was wise to assume that there would be a "psychological obstruction" due to this inhibition, and so as the body was gently lowered onto the stools, the body was propped up by pressing the hands firmly against the floor (or, on both corners of stool B) to reduce the initial

compression force to almost zero until the urethral sphincter opened. This type of control was very effective, as it was easy to sense if the compression felt too much. When flow began, the arm pressure was then gradually reduced, finally folding the arms together under the outer kitchen stool. If any discomfort were felt when thus lowering down, then the procedure could easily be reversed (by pushing up with both hands on the floor, or, on both corners of stool B), but this eventuality hardly ever occurred.

General Note: It was found **very beneficial to have egested (emptied) the bowels just before using the method, and especially for the first few first-time uses an egestion was essential, just beforehand. The first urine-voiding attempts were after** an egestion, because solids in the large intestine cause pressure on the urethra, which reduces outflow.

A high-fruit diet (meaning the standard "5 fruits per day" healthy diet, spaced out through the day), plus one large fig in the early evening, was very beneficial to the use of this method, allowing egestion more than once per day and good urine volumes were produced just after each egestion. Constipation can prevent this method and a part-full bowel (rather than 'just emptied') was found to reduce the urine volume expelled.

Method (a): Bed method:

After performing the preliminaries (see "Preliminary" section, above):

Stage 1: Figure 2 is for Method (a).

The same procedures as set out below for the Bed Method (a) were also successfully used for the Kitchen Stools Method (b). As the methods are very similar, the choice of method was a personal preference.

A 1 litre plastic receptacle was required, of about 4½ inches top diameter.

Its rim touched the side of the bed for Method (a) and was just below the underside of the nearest kitchen stool. See Appendix 1 Note (ii) for holding methods and see all Figures at the end of this paper. See Appendix 2 for suppliers.

For Method (a) a square (not round) flat-top kitchen stool (**B**) was placed about 8 inches from the side of the bed (which leaves a 3 inch gap between stool and receptacle rim), and another stool (**A**) was placed with about a 9½ inch gap from the first stool, further out from the bed, to rest the head on (not essential but much more comfortable): see Fig. 1, 2 & 5.

The stools are of equal height and the (uncompressed) bed was no higher than the stool or the method did not work, as that took pressure off the pelvic area: raising the bed height too much reduced the downward pressure on the abdomen and so drainage was reduced. The bed was preferably 1 or 2 inches lower than the stool; lower than this was not tested but should work. The simple single bed for Method (a) was a hard top type without its mattress, but covered with a folded-up bath-towel.

A shirt was always worn, to reduce friction between hands and abdomen (explained why, below). The kitchen stools were also (optionally) topped with folded-up bath-towels. Under the first stool, the 1 litre plastic receptacle (glass is too heavy and may be slippery to hold) was placed (temporarily, when not in use) in a small washing-up type of plastic bowl on the floor, as a spillage guard only.

A 3-inch gap was set up between the first kitchen stool (B) and the receptacle rim nearest to it. Then kneeling on the bed, the hands were placed on the first stool (B), (call this "Position X"). Position X is a preliminary rest position to make the abdomen horizontal to optimize drainage later, and was held for ½ minute; it was an advantage to lower the chest down onto the stool-top. Then, Position X was changed to the position shown in Fig. 2 for Method (a). This was done by carefully & gently lying forward horizontally, with the receptacle supported as shown in Fig. 2 for Method (a). Note the 3-inch gap between stool and receptacle rim.

The receptacle could be hand-held but a retort stand was strongly favoured instead. Important: see also the notes in Fig. 2 caption. The "Precaution between each Stage" mentioned above, was followed.

The 3 inch gap in this Stage 1, shown in Fig. 2, was to grade the emptying force to a low value at first, and then higher (with zero gap in stage 2i, below) as the bladder got emptier. A 3 inch gap gives a lower force than if there were no gap. This gap was especially essential if no urine was voided at all in a preliminary stage. The patient tested in this study had some (but not much) residual detrusor function.

Relaxing was essential. It typically took a few days to get used to this method of horizontal urination but it then became much easier. It was essential to persevere past the first few days for this reason. A wait of about a half a minute was typically needed for the flow to start, longer for the first few times. It was important not try to force

flow to start. Some notes on relaxation are given in Appendix 1 Note (x).

Breathing: It was found beneficial for best drainage, to breath out and to then take shallow breaths during the procedures and to avoid taking deep breaths.

A psychological block may inhibit flow in the first week of use, but a simple distraction such as thinking of something frightening was found to open the sphincter. This ruse became quite unnecessary later.

It is possible (but unlikely) that not relaxing, but trying, to urinate may be more effective and it was necessary to experiment to determine which was best.

When flow stopped, kneeling "Position X" was resumed (between every Stage), waiting and relaxed in this position for half a minute. It may be advantageous to then repeat Stage 1 before proceeding to Stage 2i below; the main factor for success of a repeat of Stage 1 was if the large intestine had recently been egested.

Although there may be a temptation to do so, it was considered very **important never to omit the Preliminary Stage nor Stage 1** of the procedure above.

But Stage 2 step ii was omitted if no flow occurred during it after waiting about 2 minutes. I.e. Stage 2 ii is optional, depending on results obtained.

NOTE: Long times in position were avoided – see the Discussion section later on the possible effect of sustained pressure on the ureters (upper tract).

Stage 2i: Repeat of Stage 1 but with no gap between the stool and the receptacle rim. After flow stopped, both hands (palms upwards) were pushed down both sides of the abdomen (raising the buttocks to allow this), with thumb ends touching just below the umbilicus. This allowed the fingers and thumbs to slightly grasp the bladder and produced additional flow.

Stage 2ii: Repeat of Stage 2i but with the stool edge pulled to halfway across the beaker opening. (The beaker top height was pre-adjusted to be just below the stool top, to allow this.) See Fig. 4, which is for Method (b), but Method (a) is similar.

Important note: It was decided not to proceed to Stage 3 below, if no drainage was obtained in the preceding stages (not counting Stage 2); this eventuality never occurred unless the bowels were full and it could always be remedied in that case by an egestion.

Stage 3: Next a rubber or plastic horseshoe-shaped curve [see Appendix 1 Notes(vi & xx) for details] was placed on the near-side (bed-side) of the first stool (**B**), with its open ends facing the bed, for Method (a). At the stool edge nearest to the bed, maybe 1 inch can overhang the stool edge, so that on lying down, its outer curved end was less than an inch above the umbilicus (i.e. it straddled the umbilicus). It was **not** placed any higher, as the aorta (the main blood vessel) is there. See Cautions section (above). See Figures 1, 5 & 7. The procedure was similar for variant Method (b, stool) and in both methods the stool (**B**) was moved back to the location previously used for Stage 2i above (no gap between stool and beaker).

Another drain was performed, with the rubber 'horseshoe' moved slightly further downwards (i.e. towards the pelvic region). This was repeated again, with the rubber slightly lower again. Flow each time could take about half a minute to begin. Relaxation was essential.

If flow did not start, the horseshoe could be moved further onto the stool and the drainage tried again. Experimenting with the horseshoe position was tried for best drainage. (After flow stopped, the rubber horseshoe was placed on the floor before removing bodyweight fully from it, to prevent it possibly falling into the receptacle.) Going back to "Position X" for half a minute, Stage **3** was then very advantageously repeated, with the horseshoe just below the umbilicus, and then repeated again, perhaps several times.

Progress of drainage: During Stage 3 there is less or no audible sound clue as the beaker fills. So to avoid quitting prematurely, it was useful to have a mirror (on the floor) to observe the final stage flow, but not essential and was seldom used.

It was sometimes productive to repeat Stage 2ii again after Stage 3. It was always advantageous to repeat Stage 3, usually several times.

A peristaltic action at the end of Stage 3 could produce more final emptying if the hands were placed on the corners of the inner stool (B) and the abdomen was then moved horizontally towards the outer stool (A), without reducing the pressure. This was possible, as the abdominal contents will slide somewhat, so that the "horseshoe" moves down the abdomen contents without sliding on the skin surface (like a peristaltic pump).

A shirt was always worn (to reduce friction) and with care, an option was also possible to slide the "horseshoe" downwards (towards the pelvic region) along the skin without significantly reducing its pressure, to give a further peristaltic action. But its pressure must not be reduced while doing this, or urine could flow upwards instead of downwards and so this option was used with caution. It was not done if there was no flow in the earlier part of Stage 3.

When getting up from this method, care was taken to avoid extra pressure on the pelvic region while doing so. **Finally**, a drink was immediately taken (one mouthful only, of water).

Method (b): Kitchen Stools Method:

After performing the preliminaries (see "Preliminary" section, above):

Stage 1: See Figures 3-5. A shirt was always worn so that the hands could easily be slipped down without friction between the abdomen and the kitchen stool top. The kneeling platform was 7 inches high, sloping down to 6 inches over 14 inches front to back. A 3-inch gap was set up between the first kitchen stool (B) and the beaker rim nearest to it. For Method (b) the elbows were first rested atop stool B (call this "Position X"), before starting. Position X is an important preliminary rest position to make the abdomen horizontal to optimize drainage later, and was held for ½ minute.

Then, Position X was changed to the position shown in Fig. 3 for Method (b). This was done by carefully & gently lying forward horizontally, with the beaker supported as shown in Fig. 3 for Method (b).

Note the 3-inch gap between stool and beaker rim. The hands or fists (shown as ●) were placed on the floor to give some body-weight support initially, and when drainage was nearly complete, the arms were then folded together under stool A.

The height difference between stool top and kneeling support, made the abdomen horizontal; it is 12 or 13 inches for an average person of height about 5 ft 10 inches.

Note: The kneeling support could be omitted if the legs of the stools were cut down to make the stool top only 12 inches high from floor level. The beaker could be hand-held but a retort stand was strongly favoured instead.

The "Precaution between each Stage" mentioned above, was followed.

The 3 inch gap in this Stage 1, shown in Fig. 3, was to grade the emptying force to a low value at first, and then to a higher value (with zero gap in Stage 2i, below) as the bladder got emptier. A 3 inch gap gave a lower force than if there were no gap. This gap was especially essential if not much urine was voided in a preliminary stage. The patient tested in this study had some (but not much) residual detrusor function, allowing some to be "normally" voided in a preliminary stage. After flow stopped, both hands (palms upwards) were pushed down both sides of the abdomen (raising the buttocks to allow this), with thumb ends touching just below the umbilicus. This allowed the fingers and thumbs to slightly grasp the bladder (this mimics the detrusor) and produced additional flow.

Later, after some experience, the 3 inch gap was omitted.

Relaxing was essential. It typically took a few days to get used to this method of horizontal urination but it then became much easier. It was essential to persevere past the first few days for this reason. A wait of about a half a minute was typically needed for the flow to start, longer for the first few times. It was important not try to force flow to start. Some notes on relaxation are given in Appendix 1 Note (x).

Breathing: It was found beneficial for best drainage, to take shallow breaths during the procedures and to avoid taking deep breaths. A psychological block could inhibit flow in the first week of use, but a simple distraction such as thinking of something frightening was found to open the sphincter. This ruse became quite unnecessary later.

It is possible (but unlikely) that not relaxing, but trying, to urinate may be more effective and it was necessary to experiment to determine which was best.

Only twice in the whole 7-year test was a slight taste of stomach acid noticed in the mouth, but this would be a contra-indication if occurring more frequently, as this acid can damage the esophagus. An immediate drink was taken.

Towards the end of flow, the head was raised to put more downward pressure on the abdomen zone. Raising the buttocks also assisted.

When flow stopped, kneeling "Position X" was resumed (between every Stage), waiting and relaxed in this position for half a minute. It was important not to allow extra weight to press down on the lower abdomen while getting up. To avoid this problem, both hands

were always placed on the corners of stool B to get up to position X: first the right hand or fist was put on the floor and used to push up, against the floor, which allowed the left hand to press up on the kitchen stool, and then the right hand was also transferred to the stool. The chin was also pushed down onto the same kitchen stool to provide additional upward force. This method was also always used for each stage below.

Important: To get extra drainage, breathing out positioned the diaphragm optimally for drainage, and then very shallow breaths were taken to keep the diaphragm position optimal. Also, to increase flow, the legs were spread out sideways, as well as lifting the knees up from the kneeling support.

It was often advantageous to then repeat Stage 1 before proceeding to Stage 2i below; the main factor for success of a repeat of Stage 1 is if the large intestine had recently been egested, which was always done before Stage 1 if feasible.

Although there may be a temptation to do so, it was considered very **important never to omit the Preliminary Stage nor Stage 1 nor Stage 2 i** of the procedure.

But Stage 2 ii was omitted if no flow occurred during it, after waiting about 2 minutes. I.e. Stage 2 ii was optional, depending on results obtained.

NOTE: Long times in position were avoided – see the Discussion section later on the possible effect of sustained pressure on the ureters (upper tract).

Stage 2i: Repeat of Stage 1 but with no gap between the stool and the beaker rim. After flow stopped, both hands (palms upwards) were pushed down both sides of the abdomen, with thumb ends touching just below the umbilicus. This produced additional flow. The fingers and thumbs were put into a grasping action to mimic the detrusor (bladder muscle). When flow ended, the knees were raised up off the kneeler, to produce further flow.

Stage 2ii: Repeat of Stage 2i but with the stool edge pulled to halfway across the beaker opening. (The beaker top height was pre-adjusted to be just below the stool top, to allow this.) See Fig. 4 for Method (b).

Important note: It was pre-decided not to proceed to Stage 3 below, if no drainage was obtained in the preceding stages (not counting the optional Stage 2i), but this eventuality never occurred.

Stage 3: Next a rubber or plastic horseshoe-shaped curve [see Fig. 5 & 7, and Appendix 1 Notes (vi & xx) for details] was placed on the near-side (beaker-side) of the first stool (**B**), with its open ends facing the beaker. On lying down, its outer curved end was less than an inch above the umbilicus (i.e. the rubber item straddled the umbilicus). Pressure should not be applied above the umbilicus, as the aorta (the main blood vessel) is there: see Cautions section above. Stool (**B**) was moved to the location previously used for Stage 2i above (i.e. with no gap between stool and beaker). Draining was done as shown in Fig. 3 but with no 3 inch gap and with the horseshoe in place). When flow ended, the knees were raised up off the kneeling support to produce further flow. To get extra drainage, breathing out positioned the diaphragm optimally for drainage, and then very shallow breaths were taken to keep the diaphragm position optimal.

Also, when using the rubber semicircle, to increase flow, the legs were spread out far sideways, as well as lifting the knees up from the kneeling support, and raising the buttocks.

It was very advantageous to repeat Stage 3 several times, with a ½ minute rest in "Position X" between repeats, moving forward slightly for each repeat, or, easier, moving the rubber item in small stages towards the pelvic region, and finally straightening the legs (lift knees off the kneel support).

It was sometimes advantageous to get up and walk about for ten seconds between voids. Flow again may take about half a minute to begin. Relaxation was essential.

The rubber 'horseshoe' position was thus moved towards the pelvic region for best drainage, but not too far below the umbilicus until drainage was nearly complete. After flow stopped, the rubber was placed on the floor before removing bodyweight fully from it, to prevent it possibly falling into the beaker.

After going back to "Position X" for half a minute, Stage **3** was then very advantageously repeated, with the 'horseshoe' just below the umbilicus, and the repeated as described above, again, and again until no more flow. It could be beneficial to walk about briefly between voids.

Progress of drainage: During Stage 3 there is less or no audible sound clue as the beaker fills. So to avoid quitting prematurely, it was useful to have a mirror (on the floor) to observe the final stage flow, but not at all essential and was usually not used. It was

sometimes productive to repeat Stage 2ii again after Stage 3. It was **always** advantageous to repeat Stage 3 several times.

A peristaltic action at the end of Stage 3 produced more final emptying if the hands were placed on the corners of the inner stool (B) and the abdomen was then moved horizontally towards the outer stool (A), without reducing the pressure. This was possible as the abdominal contents will slide somewhat, so that the "horseshoe" moves down the abdomen contents without sliding on the skin surface (like a peristaltic pump).

A shirt was always worn, and with care, it was also optionally possible to slide the "horseshoe" downwards (towards the pelvic region) without significantly reducing its pressure, to give a further peristaltic action. But its pressure was not reduced while doing this, or urine could flow upwards instead of downwards and so this option was used with caution. It should not be done if there was no flow in the earlier part of Stage 3.

At the end of Stage 3, the legs were straightened (with only the toes supporting the legs) and the abdomen was pushed forwards to produce a peristaltic action which produced extra flow.

To avoid undesirable extra pressure when getting up afterwards, the right hand/fist was first pressed against the floor, which then allowed the left hand to press up on the left corner of the nearest kitchen stool, which then allowed the right hand to be used to press up on the right hand corner of that stool. The chin was also pushed down onto the kitchen stool to take some of the body-weight.

Finally, a drink was immediately taken (one mouthful only, of water).

General Notes on the drainage procedure:

Any sudden lowering onto stool (B) was avoided, to avoid a sudden pressure change. (This is a danger for an infirm person and probably only Method (a) would be worth considering.)

When flow began to stop, pressing down the pelvis caused further drainage; first the buttocks were raised to wait for any drainage, then the pelvis was pressed down. See also the captions of all Figures.

If the abdomen was distended by an over-full bladder, and not much flow occurred in the Preliminary (see earlier) Procedures, an egestion was done to correct this problem. The subsequent procedures must not be done if this problem could not be corrected, but this correction never failed in the case reported here.

Later Development – Final Method used:

After several months of using Method (b) as set out above, it was finally simplified to:

(i) **Procedures: Preliminary:** Hand-assisted method (given above).

(ii) **Stage 2 i** (given above).

(iii) **Stage 3** (given above).

Comment: Looking back, it would have been **in**advisable to have used this final method from the start, and the full Method (b) was desirable until experience had been gained.

Diverticulum Drainage:

The patient whose drainage is described in this paper and in reference [1], had a diverticulum, probably gradually caused in the months before the outflow rate became very low, which he did not know could cause a diverticulum. It is not mentioned as having this effect in many popular medical texts. Its formation can be a possible consequence of not realizing that a gradual reduction in bladder outflow can cause bladder pressure which may cause part of the bladder wall to balloon out, irreversibly. This forms a second “bladder”, but one without a detrusor muscle to empty it. In the case described here, the ultrasound pictures [1] show a dark sack (diverticulum) behind the bladder. “Behind” means further away into the abdomen, from the ultrasound probe. Fortunately, in this particular example the diverticulum formed behind the bladder, so that when lying face-down, it tended to drain into the bladder.

Results:

Best drainage occurred with the bladder muscle (detrusor) relaxed, i.e. passive and not trying to urinate. It took several days to get used to the procedure, but it was then very successful and became routine and easy.

Table 1 [1] shows results obtained.

Fig. 2 & 3 in the author’s paper [1], show ultrasound scans of drainage results.

(Note: that Figure numbering [1] is not the same figure numbering as used here).

See also Appendix 1 below.

Discussion:

The pressure in a viscous fluid is the same everywhere, even if it is non-Newtonian (a non-ideal liquid but having no elastic restoring property). But if there is some elasticity, this will not apply. If the

abdominal contents approximate to a non-elastic viscous fluid, a pressure applied to them will be transmitted uniformly everywhere and this pressure will be equal both outside and inside the bladder, and both outside and inside the tubes (e.g. the ureters) connected to it. This would not apply for an over-full (over-distended) bladder which occupies a large % of the abdominal volume; this can be assessed visually or by ultrasound or by the traditional finger-tapping method as used to check the lungs.

Pressure was applied uniformly across the whole width of the abdomen below the rib-cage and not locally to the bladder. For a 160 pound weight person, this pressure caused by the weight of the abdomen (about 80 pounds acting on a 100 inch² kitchen stool area), equates to 50 cm of water. [For above-normal BMI overweight people, a larger board would need placing atop the normally 10x10 inch abdominal support platform, or a miniature table could be used instead, to ensure the pressure does not exceed that in the calculation given above (50 cm of water). A simple re-calculation must be made.]

As this pressure is exerted over a large abdominal area of 100 square inches, it is transmitted to both the outside and inside of both the bladder and the ureters. Thus the upper tract tubes (the ureters) would not experience an inflation (dilation) pressure coming from the bladder, unless there is a significant elastic component involved in the contents of the abdomen, or unless an over-distended bladder occupies a large fraction of the abdominal volume. The pressure is only applied for about a minute. But even if all of this pressure were transmitted only to the inside of the ureters, it should normally still be below the danger pressure for inflating them (upper tract damage), as seen from the following data for normal BMI persons:

(i) A bladder pressure of 20 to 40 cm of water occurs during normal urination [2]. A sustained bladder pressure of over 40 cm of water puts the upper tract at risk [3], but a leak point pressure of about 40 cm of water is reported [3] as necessary for reliable continence. (See also below.)

(ii) A ureter pressure of 20 to 60 cm of water occurs during its normal functioning [4].

Another method, the Crede maneuver [5, 6], in contrast to the present method, selectively manually squeezes only the bladder contents which will raise the pressure only inside the bladder and ureters. This could be undesirable as it could cause dilation of the ureters. The passive nature of the present method and also its

allowance of total relaxation of all muscles in the body are important advantages over the Crede method [7,8,9]. The classic Crede maneuver requires manual compression of the bladder and is most effective for those who are strong enough to generate more than 50 cm of water by such manual action [5]. It is only useable where outlet resistance is un-obstructed. The Crede technical details are as follows.

Both thumbs are placed over the anterior superior iliac spines and the digit fingers are placed over the suprapubic region, with the fingers slightly overlapping. The latter are pressed into the abdomen and when they have penetrated behind the symphysis they are pressed downwards to compress the bladder fundus. Both hands are then pressed deeply into the real pelvic cavity. But the tendency of this method to locally compress the bladder may cause its pressure to rise above the safe level for avoiding upper tract deterioration, especially for a person with strong hands. This is avoided by the presently described passive method, where a calculable (and acceptable) pressure is applied passively only by the weight of a normal BMI patient acting over a known area of surface.

In a study of bladder emptying methods, the Crede maneuver has been discouraged in some cases [5, 6]. The Crede maneuver and urinary management have been studied [7, 8] and it was found [8] that when the Crede maneuver was applied, 96% of 207 patients showed a contraction of the urethral sphincter, an increase in urethral pressure and a maintained closure of the vesicle neck. Only 4% of the patients showed a relaxation of the sphincter and simultaneous opening of the bladder neck [8]. This is probably at least partly due to the mental stress of most patients when trying the maneuver, requiring considerable strength and preventing the essential relaxation required for opening the urethral sphincter. The passive and relaxed nature of the present method is an important point of difference from the Crede method and offers a considerable improvement over the Crede maneuver. The present passive method allowed total relaxation of all muscles throughout the body.

As mentioned above [3], a sustained intravesical pressure of over 40 cm of water must be avoided. McGuire et al [9] found 81% of urine retention patients whose bladder pressure at leakage exceeded 40 cm of water had upper tract damage. Any regime of urination should not allow a sustained bladder pressure to reach 40 cm. Most adults have non-refluxing ureters, and a fairly high bladder pressure (as occurs with the Crede maneuver or even with normal voiding in healthy individuals) can occur without urine backing up into the upper tracts. Even for those rare adults with refluxing ureters, short durations of increased ureteral pressure are

not thought to be problematic with respect to renal function unless the urine is infected, in which case pyelonephritis may theoretically result from reflux.

So emptying by the method described in the present paper was done 2 times daily, plus some conventional urination in between (otherwise 4 times daily could be needed); not much fluid was habitually drunk in the case described in the present paper, but a urination frequency recommendation is very approximate as it depends greatly on individual drinking habits. It would be the same as for self-catheterisation for those needing that, or slightly more, to allow for some residual volume (see Table 1 in [1]).

In the last stage of the sequence given in the present paper, the (optional) use of a much smaller pressure area (under a rubber semi-circle shape) was avoided until after more than about half the urine had been expelled. This final stage could be described as a "passive Crede" stage but it was done with the abdomen horizontal, and facing downwards.

The present method has been used successfully for 7 years without adverse effects for one person of normal BMI, and trials are due to begin of others, which will be reported later. As the method is purely mechanical, it could be expected to work for almost all people, but the effect of the BMI must be considered. The person tested was a "worst case" situation, as there was a large diverticulum as well as a bladder to empty. The method was completely non-invasive, so no infections ever occurred.

One week was found sufficient to stabilize consistent good results, being the time needed to overcome the psychological tendency not to urinate when in a horizontal position. Longer times could be needed if stress due to this effect is more deeply instilled, and relaxation techniques (before starting the procedure) may be beneficial. See Appendix 1 Note (x).

Figures 2 and 3 (in [1]) (ultrasound pictures), with the patient standing upright, show typical results; Figure 2 was after a "normal" preliminary urination and before Step 1 of the above procedure; Figure 3 was after the entire procedure.

Diet is an important factor. As the greatest volume drained was soon after the bowels were egested, the high fruit diet generally recommended for good health ("5 fruits per day") was conveniently beneficial for this method and was not regarded an "imposition" specified for the method. The converse is true: if fruits were

deliberately omitted from the diet, then the drainage could be much less. See further notes under Table 1 in [1].

It is possible that certain foods may inhibit urination and should be avoided. On one occasion, grapes appeared to have this effect but further tests were not done to confirm this.

A different drainage method:

For comparison, another quite different draining method, very easy and comfortable, was tried, by reducing the atmospheric pressure locally around the penis, by 5%, and also by 10%, while attempting to void urine normally, which is equivalent to being suddenly transported to a mountain-top. But this method drained much less than the above method, only roughly 100 ml, because the urethra collapsed due to the excess blood which entered the penis due to the local low pressure around it. The low pressure caused the penis to expand, but the expansion unfortunately also occurred inwards and pressed the urethra in the penis flat, stopping further flow.

Future research on this partial vacuum method: A short catheter (only slightly longer than the vacuum tube placed around the penis) may prevent such urethra collapse and thus permit this method, but this was not tried. This would avoid the entire procedure above, but there is a possibility of catheter-caused infection, but future research is worthwhile on it, as infection may be unlikely as the catheter would be quite short. It would also be very easy to insert, as it need not be pushed through the urethral sphincter, which is a point of difficulty and discomfort in conventional self catheterisation.

Future research

See the last part of the paragraph above, on the vacuum method.

On the method described in the present paper, instead of the fixed rubber "horseshoe" used in this study, a roller could be devised to allow the patient to easily slide forward to facilitate a peristaltic action. This could be billiard or snooker (pool) balls drilled with axial holes and threaded slightly loosely on a string and laid out in a crescent shape on a flat wood stool-top, to allow sufficient rolling action to slide forward to optimise the final drainage stage. Less easy, would be a progressive pneumatic inflation of hollow rubber shapes below the abdomen.

Use of a ratcheting hold-down strap, as used to secure a box on a flat-bed vehicle, could provide a way of standing vertically instead of the horizontal method described in this paper. A rubber half-

tyre, as used in Stage 3 above, could be placed under the strap at the front, to mimic the detrusor. This has **not** been investigated and could be dangerous and it is not suggested to attempt this. There is no automatic upper pressure, which the horizontal method automatically has (because the abdomen's weight automatically limits the applied pressure, in the horizontal method described in the present paper). For a ratcheting strap, it would be necessary to devise a way of limiting the pressure to a safe value.

The method described in this paper could also be considered (but has **not** been explored) for use in some neuropathic bladders, e.g. in unobstructed patients after iatrogenic sacral nerve injury following (say) abdo-perineal resection for rectum cancer conditions. But for neuropaths most Spinal Units would advise against the use of abdominal pressure to empty as it may cause stretching of an already paralysed pelvic floor and predispose to subsequent stress incontinence in the longer term.

CAUTION: The methods described should not be construed as medical claims or advice. It is important not to deliver a pressure higher than a normal detrusor muscle would reach, but the graded method described here easily achieved this aim, for a normal BMI patient. It **must not**, of course, be used to overcome an obstructed urethra (e.g. caused by an enlarged prostate, or by a defective urethral sphincter or a stricture). The method is unsuitable for some neuropaths with an outlet obstruction and full medical advice is necessary, as pressure could be transmitted up to the kidneys. It must be remembered that an obstruction may recur in a few cases about 10 years after a TURP operation for an enlarged prostate, if the prostate re-enlarges (as deducible from the flow rate falling). The flow rate can be monitored annually (as described earlier).

The method **must not** be used if the bladder is over-distended due to inability to urinate for an unknown reason. See the procedures described in **Procedures: Preliminary** above. (See also General Notes in the Procedures section, above.)

Aortic Aneurisms: The method must not be used if the main blood vessel to the lower half of the body is over about 2.5 cm in diameter. This artery runs from the heart to the umbilical region, where it divides. A quick ultrasound scan (non-invasive) can easily measure its diameter along the region below the rib-cage down to the umbilicus. In using the bladder draining method described in this paper, no pressure was used above the umbilicus, to avoid restricting blood flow through this artery, which could cause a

pressure rise. If this artery is over about 2.5 cm diameter, there is a risk of an aortic aneurism, where it balloons out and can burst – a cause of death of about 7000 men in the UK annually. If over 2.5 cm diameter, medical advice should be sought as soon as possible; there is a free aortic aneurism ultrasound scan service available in the UK (NHS), or, private scans cost about £200. The normal diameter should be 1.2 to 2.5 cm.

For first use of the bladder draining method, there was a “psychological obstruction” due to a (commonly held) long-standing mental (psychological) inability to open the urethral sphincter while lying horizontal, and so first-use was with a bladder not more than two-thirds full and with the hands supporting some of the body weight. When this traditional mental blockage was overcome, it was found that the method worked very well.

The kitchen stool method (b) would be unsuitable for unaided infirm subjects if they are unable to get up without risk of their hands slipping off the stool thus causing a hard fall-back onto the stool.

Note for any patients who may be reading this paper: The methods described must be fully discussed with your doctor before trying them and should not be construed as medical claims, or advice, and are only a description of a method that has been found to work. It is not implied that they will work for everyone, nor that they are recommended for use in any particular case. Pain is a definite contra-indication. There should be no pain when using this method. However, pain may simply indicate a temporary obstruction which may be caused by a too-full colon; in this case, the bowels should be emptied before trying again. If pain is caused by a too-full colon, the method should not be used until the bowels are emptied.

Also, the method should not be done until several hours after a meal, as the stomach contents may be pushed upwards, but if this caution was followed there was no problem with such an occurrence. Only twice in the whole 7-year test was a slight taste of stomach acid noticed in the mouth, but this would be a contra-indication if occurring more frequently, as this acid can damage the esophagus. An immediate drink was taken. But the method was never used soon after a meal.

This paper is a report of the experience of a patient using this method.

No responsibility is accepted for any adverse consequences that may arise from copying this method.

Conclusion

A rapid non-invasive non-catheter method for draining urine from the bladder is described, which may be of interest to men who have an over-distended detrusor which is under-active due to obstruction of the upper end of the urethra (bladder outlet tube) caused by enlargement of the prostate. This condition leads to incomplete bladder emptying.

A major advantage of the method is that **no catheter** needs to be inserted.

Using a catheter twice daily can be uncomfortable and can cause entry of infection into the bladder which may then require antibiotics to remove.

This much faster method has been tested for 7 years on one patient with low pressure chronic retention, and was found successful, with no complications, **no infections ever**, nor any adverse effects. There is no cost because no catheters were required.

APPENDIX 1: Specific Points

Notes:

(i) Possible spillages: Great care was needed not to accidentally spill any urine. The receptacle was stored (when not in use) in the bowl on the floor. A large towel was placed on the floor under the bowl and stool as a further possible spillage precaution.

(ii) Receptacle holding method: A great improvement from a simple handholding of the receptacle was to obtain a simple retort stand of the type used in chemical laboratories for supporting round-bottomed flasks (see Appendix 2).

This is a simple steel ring clamped to a vertical rod fixed to a small (about 7 inches by 4 inches) horizontal metal base-plate with a heavy metal weight placed on it for stability, that stands on the floor. Ideal sizes are a conical plastic beaker of top diameter 4½ inches and bottom diameter 3½ inches and a steel ring of 4 inches inside diameter (see Appendix 2). This was very stable and makes spillage very unlikely and it allows much more relaxation as there is no beaker to hold onto. This was a very good arrangement. See Fig.2 & 3.

The beaker top diameter was chosen to allow the genitals to easily fit into its top without discomfort. The size was chosen to contain 1 litre and the bottom diameter was chosen so that it would not drop through the ring-clamp conveniently used to support it.

The clamp was set so that the beaker top was just below the underside of stool B. The positioning of the supporting stand and rods was set such that moving the kitchen stools while going through the Stages 1 to 3 did not allow the stool legs to be obstructed by the rods or stand.

Caution: A simple safety precaution -- the vertical rod was cut so that it ends just above the clamp, or, a small upturned strong-plastic beaker could be placed on it, to avoid any damage to the face or eye if bending down quickly and not seeing the rod end-on. It was considered important **not to omit** this simple precaution. A list of parts used is given in Appendix 2.

(iii) Waiting times: Half a minute in "Position X" between stages could be too short for the time needed for the bladder muscle to relax back to its relaxed state. Longer waits were tried if necessary but were not usually needed.

(iv) Bowel state - Important: Drainage was **much more** complete if done after the bowels were opened (i.e. after egesting the contents of the large intestine) rather than before. And less pressure was required. Doing this also significantly helped the chances of not having to get up during the night to urinate. The maximum amount of fluid change also reduces stasis, which reduces any risk of infection, and stasis could (rarely) predispose to cancer [10, 11, 12]. The eating of a high fruit diet by the patient was very beneficial (for egesting the bowel contents).

If bowel voiding was felt to become necessary while doing the drainage, it was found **essential to stop to do that**, and only then to continue with the draining, which was then very much improved. The method was avoided soon after a meal, as drainage was less than if done before. It was considered important always to perform the drainage method after a bowel egestion, to achieve the minimum residual volume as often as possible, to minimize stasis.

(v) An alternative good procedure, also useable if traveling away from home:

In a hotel, one flat-topped kitchen stool (i.e. stool **B** only) or equivalent, was obtained from a local shop, of height about 18 inches or about equal to the height of the knee-cap from the ground. Another small suitcase was then placed lying flat, in front of it, to kneel on; this was fibreglass, strong enough not to be damaged by the bodyweight. Its ideal height from the ground was about 6 to 7 inches. Before doing this it was found advantageous to lower one's head down, to apply more pressure to the top of the bladder, and drain.

This method worked very well. The beaker was held by hand (if traveling) and the other arm was used to support the shoulders. The height difference between the kitchen stool (or equivalent) and the kneeler suitcase should be about 12 inches (for an average height person, of say 5 ft 10 in), but if a single object of height 12 inches is available, then the smaller kneeling-support suitcase was not needed. The surface area of the abdominal support was 12 inches square.

Some specialist companies make a folding stool (e.g. Fig. 6) which was easily carried on away visits and a 12 inch square of ½ inch plywood was also carried (to fix onto it), giving a very good solution. Preferably, a 24 x 12 inch plywood was used, supported on two folding stools.

If a hotel room is not available, then only a "Disabled Toilet" would have enough floor area to use this solution.

In a hotel room, if a low table with twice the surface size of a typical kitchen stool were available, the procedure was much easier and there was also no need to support the weight of the shoulders. For a higher table, the knee-platform height was increased by an appropriate amount. The applied pressure was easily varied by sliding the knees backwards to lower the abdomen. As above, a preliminary "normal" urination and then the 3 stages of progressive graded draining were done.

Other variations are possible but have not been explored:

E.g. it may also be possible to avoid using a beaker if a condom-catheter and a foley bag were used instead. But this would take considerably longer, as the condom-catheter and foley bag would have to be washed out thoroughly after each use (or discarded at suitable intervals but this could be costly).

One of the aims of the method actually used was to minimise the time needed for it, and to minimize cost.

(vi) Item needed for stage 3: In ref [1] a "crescent shape" is mentioned, but if rubber, this should be "horseshoe shape" or "semi-circle" shape.

IMPORTANT NOTE: See also Note (xx) below.

A rubber horseshoe piece was made as follows:

A replacement solid-rubber tyred wheel [of outside diameter about 8 inches (8" x 1.75")] for a wheelbarrow was purchased. This was on a plastic hub. Being non-metallic, it was cut in half (across the diameter) with an ordinary wood saw (tenon saw).

The half-tyre was then removed from the plastic hub.

The cut edges were chamfered well with a file so that it did not feel too abrupt when lying on it.

The finished item, when placed on a flat surface is about 1.5 inches high, 1.75 inches wide (rubber) and 13.3 inches along the outer perimeter.

These dimensions were for a small/medium build person. For a large-build person, the tyre would have needed to be larger. See Fig. 7.

(vii) Experimental volumes voided:

After an initial normal urination of 150 ml:

For a typical further 500 ml of total drain using the described method, the Stage (1) typical drain was about 150 ml, Stage (2) was about 100 ml, and Stage (3) was about 250 ml (very approximately). These approximate individual stage 1, 2 and 3 volumes are reported only as a useful indication of the stages being correctly performed. They are mid-day and evening figures; early morning figures are larger and are given in Table 1. Voided volumes are very variable (see Notes under Table 1). Such factors are not easily controllable in this type of study, but Table 1 shows total voided volumes for the patient where partial control of some of the factors was achieved.

Residual fluid in the bladder (found by ultrasound scan) was about 20 to 65 ml (see Table 1), which is well within allowable limits. Larger residual fluid volumes in a bladder are acceptable; according to Weiss, George & O'Reilly [13] a chronic residual urine retention of more than 300 ml has potential for upper tract obstruction and so as a guideline more than 200 ml is undesirable [13].

Residual fluid volume in a diverticulum (a balloon-like sack on the side or back of the bladder), if present, depends on the capacity of the diverticulum and in the present case was about 250 to 300 ml for a large diverticulum of about a litre capacity.

These residual figures are satisfactory and were measured by ultrasound after using the described method, for the patient having a large diverticulum and some (but not much) residual normal detrusor muscle action.

During the "horseshoe" stage, lateral rotation to the left, leaning the patient's weight onto his left side, increased the voided volume, due to the location of the diverticulum in this patient.

Experimentation is necessary for each case if a diverticulum is present.

Similarly this method could be cautiously explored (by a urologist) for patients with neobladder (urinary diversions made of bowel) that do not drain optimally.

Further experimentation for optimisation could be important in individual diverticulum cases, such as use of different shaped "horseshoe"-type objects.

(viii) Frequency of use: The above non-invasive procedure was advantageously able to replace self-catheterisation, and it cannot cause infections which may occur with catheters. No infections at all occurred in the 9-year trial.

Ideally, the method was done **first thing** in the morning and **last thing** at night, plus "normal" (hand-assisted) urinations at other times, to the extent possible.

Important: The patient whose case is reported in this paper had the "advantage" of having the extra capacity of a large diverticulum, but in the absence of that extra volume it may have been necessary to use the method more frequently, perhaps about every 2 or 3 hours, depending on the amount drunk, especially if there were no residual detrusor action possible.

(x) Relaxation techniques: In the early stages, in cases of difficulty relaxing, some references are given which may assist [14-17].

These include relaxation methods and biofeedback techniques. These include "sound and light devices" (e.g. D.A.V.I.D. made by Comptronics Inc.:

www.mindalive.com/manuals/delight_pro_manual.pdf),

and cranial electrical stimulators (CES units), Ganzfeld units, and flotation tanks.

They are available from Tools For Wellness (see below).

Reliable tapes and CDs for relaxation can be found from:

www.learningstrategies.com (their "Deep Relaxation" tape or CD).

www.toolsforwellness.com/relaxation-books.html (several CDs available).

Alternatively, a simple distraction may be very effective, such as simply listening to a talk programme or a weather forecast on the radio, during the procedure.

(xi) Caution: Depending on position, the kitchen stool leg (see Fig. 2, 3 & 4) could catch on one of the clamps and pull over the whole assembly, spilling urine on the floor, if the stool is moved. So moving the stool was avoided until the beaker had been lifted out. As extra precautions against such accidental spillage, a bath towel was spread on the floor and a very heavy metal weight was placed on the retort stand base for improved stability.

(xviii) For the first drainage, both hands were slid, with palms upwards, between the kitchen stool and the abdomen, and then the hands were used to grasp the bladder to squeeze it, to mimic the detrusor muscle.

(ixx) To get back up to "Position X", for a right-handed person, the upper bodyweight was supported with the right fist on the floor, the left hand was then used on the nearest kitchen stool corner to start pushing up, and then both hands were put on its two corners. Extra weight was thereby **not** allowed to press down on the bladder area during getting up.

(xx) NOTE: A tightly-rolled towel could be used instead of the rubber horseshoe shape described below, if the rolled towel diameter is 3 inches and length 18 inches, and it must be bound every two inches with string loops. It is placed like a crescent but it (or the rubber semicircle) MUST be BELOW the umbilicus. The towel or a rubber semicircle applies pressure around the bladder, thus mimicking the detrusor muscle. A rolled towel is more easily available but **best results** were obtained using a rolled towel first, then a rubber semicircle, both several times each. Use thumb to locate umbilicus when bending forward.

APPENDIX 2: List of parts used.

The following are listed in Fisher Laboratory Supplies Catalogue, UK, at <http://www.fisher.co.uk>

Polypropylene beaker, 1000 ml, 150 mm height, 111 mm neck I.D., 91 mm base I.D., BNH-600-130C -----£8 for pack of 10.

This item is presently not available but alternative suppliers are:
<http://purchasing.ukplc.net/websites/product.aspx?CompanyID=232282&IngProductID=1540187>

Azlon tapered polypropylene beaker, 1000 ml but at large quantity prices, or from http://uk.farnell.com/jsp/search/productdetail.jsp?sku=7137151&_requestid=394989

£3 each but not tapered – so care was needed in selection of steel ring clamp inner diameter. Obtained from Google search for: beaker, polypropylene.

The following are listed in Fisher Laboratory Supplies Catalogue, UK, at <http://www.fisher.co.uk/>

Steel Ring, 100 mm I.D., STF-520-051S -----£3.

Bosshead (clamp),

STE-321-011E -----£14 for pack of 5 (3 clamps needed).

Retort stand base (less rod),

STA-442-050G -----£7. (If not available, then any retort stand)

3 rods, length 400 mm (recommend cut all 3 to 300 mm for safety)

STH-710-070Y -----£4 each. (If not available then any ½ inch dia. rods)

Local suppliers of equivalent items could be used instead.

