

Section of Urology

President W H Graham FRCS

Meeting October 26 1967

President's Address

Injuries to the Urogenital Tract

by W H Graham FRCS

(Royal Infirmary, Preston, Lancashire)

Probably the earliest description of kidney injury is attributed to Galen in the second century A.D.:

'One man also, when he fell injured but with his spine undamaged, at first passed a copious flow of blood with his urine but later his urine was completely stopped. We concluded that the reason for this was a clot of blood causing an internal obstruction. A tube inserted for this purpose into the penis produced a slight flow of urine; and then when the tube was extracted there appeared traces of the clot at its mouth.' (Galen: 'Opera Omnia: De Locis Affectis', VI, 4).

Bruce Clarke (1886) stated, and it is true today: 'It is a comparatively rare occurrence to come across a case in which the kidney has been ruptured without the infliction of an external wound where surgical interference is called for, though many cases of probable kidney injury get well without any treatment except rest in bed.'

Ramon Guiteras (1912) wrote: 'Kidney injuries are rare, if surgical wounds are excluded. In 7,741 cases of injuries reported by Küster only 10 were renal.'

Neligan (1948) wrote of kidney injuries: (1) They comprise a very small percentage of injuries admitted to a large hospital. (2) Nearly every case is due to direct violence. (3) 90% of the cases occur in males. (4) 'At the London Hospital during the twenty years 1921-40, there were admitted only 53 cases of renal injury amongst 150,212 surgical cases taken into hospital, that is 0.03%. It is interesting to note that in the last three years of that period no renal injuries were admitted.'

Today, injuries to the urogenital tract are occasionally admitted to the casualty department

of the acute general hospital. However few they may be, all can benefit from treatment by surgeons with specialized training and experience. These injuries fall into two groups: (1) Those associated with multiple injuries, severe in nature and often fatal in outcome; these are increasing in number. (2) Those limited to different parts of the urogenital tract which are less severe in nature and rarely fatal.

Group 1: Multiple Injuries

The usual causes are road and industrial accidents. Because of shock and hæmorrhage they are first dealt with by the resuscitation unit under the charge of the accident team to which the urological department must give support twenty-four hours a day, seven days a week, with a surgeon or registrar capable of dealing with any type of injury to the urogenital tract.

Head, chest, abdominal injuries and fractures, particularly of the pelvic girdle, form part of the problem. Team discussion and co-operation decide the priority of treatment. The surgeon who deals with such a patient faces grave responsibility and must be prepared to institute emergency treatment, to recognize the need for specialized help and to assess priorities (Garden 1962).

Group 2: Injuries Limited to the Urogenital Tract

These injuries rarely require the intense resuscitation which justifies admission to the resuscitation unit. Nevertheless resuscitation must be adequate: inadequate replacement of lost blood is the main cause of renal anoxia with tubular damage, renal failure, uræmia and the need for dialysis.

Injuries to the Kidney

Marked variations are found in the reported lists of classified injuries to the abdominal viscera but, in our experience, injuries to liver and spleen outnumber easily those to kidney and bladder.

Cause: Trauma may be limited to the kidney when it follows a blow in the loin, e.g. by the handle-bar of a cycle, the elbow forced into the loin or a kick at football (in both the round and oval ball games) (Table 1). As a result of the popularity of Rugby football around Leeds, 25% of the 37 renal injuries admitted to the Leeds General Infirmary from 1956 to 1961 (Wilson 1963) happened in this game.

The tendency of a certain section of the public to clamour for the abolition of blood sports and those athletic pursuits which form part of our national heritage and are enjoyed by our more virile youth led me to make further enquiries in an attempt to establish these statistics in their proper perspective.

Personal communications were received from the Medical Officers of two northern public schools both of which have been famous over the years for the quality, vigour and success of their Rugby football. Dr R W Chalmers of St Bees School, Cumberland, stated:

'As Medical Officer of St Bees for thirty-one years and for six years during the war to the Mill Hill School, in that time I can remember only one case of hæmaturia and that in a Mill Hill boy who had a kick in the loin. The kidney was not removed in this case.'

Dr E K Morris of Sedbergh School, Yorkshire, writes:

'There has been no case of renal contusion within the past eleven years. Within the past twenty years, there have been four: three caused in rugger and one in tobogganing. The volume of rugger played here is vast, I have no idea of the figure for boy/games involved but it is not unusual to have 270 boys playing simultaneously. The incidence of injuries is an indication of the quality of rugger taught and played. The cause is often clumsiness induced by fatigue (as in starting a season over-abruptly before boys have got themselves adequately fit, through playing too often or by playing too long). Injuries are rare in football that is played in the letter and spirit of the law by those whose standard of physical fitness is of a high order. It would not be surprising if investigations were to show that the realm of first-class Rugby supplies a disproportionately small minority of patients.'

Dr W H Fletcher of Workington, with 40 years' experience as Medical Officer to the Rugby League team, has seen one case of kidney injury.

Penetrating injuries due to stab wounds or missiles were not seen in our civil experience. In war casualties, penetrating injuries are usually associated with damage to other organs.

The ever-increasing number of road accidents contribute their share of fatal injuries. Thanks to the courtesy of Dr A A Miller, our senior pathologist, I have been privileged for several years to inspect kidneys from his post-mortem examina-

Table 1

Kidney injuries admitted and investigated 1958-67 (no cases in 1959)

<i>Cause</i>	<i>No. of cases</i>
Road accidents	11
Falls	8
Blows or kicks	7
Football	5
Cycle	4
Cricket ball	1
Judo	1
Leopard	1
Total	38

tions. During the years 1966-7 there were 150 fatal road accidents in the Preston area. A unilateral transverse tear was found in 10% but more severe damage in less than 1% consisting of an avulsed pedicle or shattered parenchyma not considered to be the cause of death. There was no case of a bilateral tear. A woman, foolishly attempting to walk across the M6, was knocked down by a car and run over by six more: she sustained a complete laceration of the dorsal spinal cord, the liver and spleen were shattered, yet one kidney was intact and the other only lacerated.

Due to its protected site and its mobility the kidney escapes injury where other organs suffer.

Rarely does renal injury in itself lead to a fatal issue and such was not seen once in our series.

Diagnosis: There is a history of a blow in the loin. The general appearance and condition of the patient indicate a degree of shock. Hæmaturia is usually present. Pain, tenderness and guarding or a palpable mass in the loin or along the line of the ureter are characteristic. Auscultation may show a 'silent abdomen' due to peritonism.

Investigations: A careful general examination must be made for associated injuries - in children it is difficult to exclude concomitant injuries of the abdominal viscera. There must be an accurate assessment of the degree of shock by pulse rate, blood pressure and hæmoglobin estimations and the patient's blood group must be determined. Excretion pyelography (we prefer the infusion technique) should be done as soon as the general condition allows. The presence of adequate contralateral kidney function is most important. In one of every 245 persons only one kidney is functionally adequate (Bell 1950).

If no function is seen in the damaged kidney, there is no point in repeating the excretion pyelography under seven days. Retrograde pyelography may be done as soon as the general condition allows, and renal arteriography be considered.

In reviewing 66 cases from the Glasgow Western Infirmary, Mack (1961) pleaded for a more general use of excretion pyelography. He stressed

the value of early retrograde pyelography which will reveal urinary extravasation undetected by the intravenous method and considered that those showing anything more than a minor extravasation should be explored early before tissue reaction makes repair difficult or impossible.

'Conservative' treatment: (1) Sedation for pain. (2) Close observation, half-hourly pulse rate and blood pressure. The value of conserving successive specimens of urine for comparison may be questioned but at least it indicates to the ward staff the importance of close observation of the patient. (3) Chemotherapy and antibiotic cover is routine. (4) Strict confinement to bed for seven days.

Indications for operative intervention: Immediate: (1) Persistent hæmorrhage leading to exsanguination as shown by increasing pallor, rising pulse rate with falling blood pressure and hæmoglobin levels in spite of adequate transfusion. (2) The suspected presence of concomitant intraperitoneal lesions. Delayed: Where an increasing mass in the loin suggests a collection of extravasated urine and blood.

Operation: This is begun only after confirming the presence and checking the function of the other kidney. Rarely should this have to be done on the operating table.

The most expeditious approach, as in any emergency, is by the incision most familiar to the surgeon concerned. Once the patient is on the operating table it is important to avoid increasing the degree of 'shock' by changing the position. In children, exploration of the upper abdomen through a paramedian incision will allow the kidney to be inspected and any necessary surgical intervention to be undertaken. In the adult, however, with the patient in the semi-lateral position a transverse incision in the line of the eleventh or twelfth rib gives a better exposure of the kidney and of the intraperitoneal organs liable to be damaged. A thoraco-abdominal incision in the line of the tenth rib gives satisfactory exposure for the triple injury of ruptured spleen, diaphragm and left kidney.

Discussion: We appreciate that 'conservatism' is not the accepted line of treatment in every country. Here we speak to the converted. Lowsley & Kirwin (1956) made the following dicta: (1) If

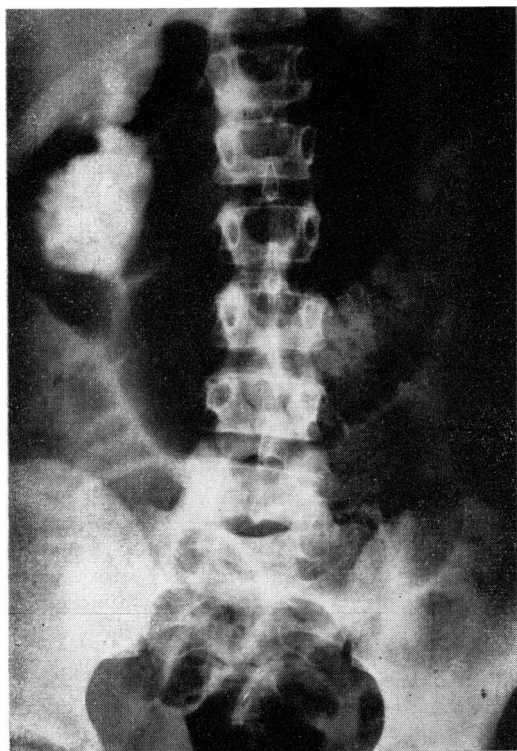


Fig 1 Right retrograde pyelography showing extravasation from lower pole

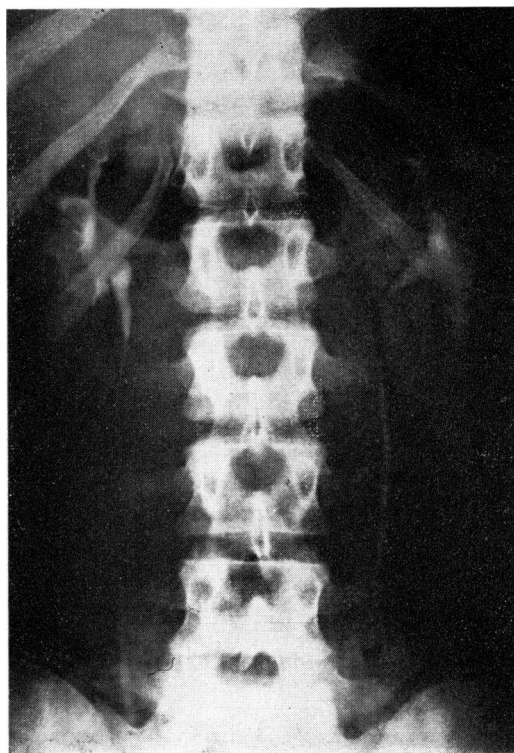


Fig 2 Excretion pyelography from the same case as Fig 1, taken six years later

shock is great give supportive and restorative treatment and carry out exploratory operation at the earliest safe moment. (2) If the injury has not appeared grave at the onset but hæmaturia continues for twenty-four hours, operate. (3) If tenderness or swelling or both persist in the loin, operate.

It is with the first and second I disagree. The patient who has responded to transfusion can be investigated and the degree of renal damage assessed. The intensity or duration of the hæmaturia bears no relation to the outcome: unnecessary operations are done, some kidneys are sacrificed and a few lives are lost.

Badenoch (1950), in a personal series of 46, operated on one patient in the first few hours. Three required nephrectomy in the third week.

Of the 38 renal injuries in our own series, 7 required operations, 3 immediately, all children: one explored for a suspected rupture of the liver showed only a small liver laceration but an extensive tear in the right kidney necessitated nephrectomy; the second needed splenectomy and the ruptured left kidney was left alone; the third was a negative abdominal exploration and the ruptured right kidney was also left undisturbed. Only one case required nephrectomy.

Four were the site of pathological lesions: the first showed congenital polycystic disease; the second juvenile obliterative endarteritis; the third, a congenital hydronephrosis, required nephrectomy; in the fourth, a ruptured hydronephrosis, pyeloureteroplasty was done with a successful result.

The remaining 34 injured kidneys were followed up by intravenous pyelography and/or retrograde pyelography. All were normal in six months with 2 exceptions: the left kidney of the boy who had undergone splenectomy showed distortion of the lower pole calyces, but ten years after his accident intravenous pyelography was normal; a girl, aged 7 years, on retrograde pyelography showed extensive extravasation from the lower pole of the right kidney; six years later IVP shows a normal pyelogram but the right kidney is 4 cm shorter than the left; she remains normotensive (Figs 1 & 2).

I have seen one kidney injury which developed a pseudohydronephrosis: an Indian Army havildar was knocked down by a lorry and sustained a rupture of the right kidney; weeks later a mass was noted extending across the upper abdomen; right retrograde pyelography revealed it to be an extension from a hydronephrotic kidney. Through a right loin incision many pints of urine were evacuated. The incision continued to drain for a few days but gradually dried up and healed, with complete disappearance of the mass. As a boy he had been taken to a Calcutta Hos-

pital, was diagnosed as having bilateral hydronephrosis and operation was advised; his parents declined.

Conclusions: My own experience is that early operation is rarely indicated and delayed operation but seldom. If an immediate exploration of the abdomen reveals the cause for which it is undertaken, hæmorrhage or visceral trauma, time should not be wasted and shock increased by exploring a perirenal hæmatoma. The normal kidney, like all organs with a rich blood supply, heals rapidly when injured.

Injuries to the Ureter

Ureteral injuries are rare except in war casualties with penetrating wounds of the abdomen or following the pelvic exploits of the gynaecologist or proctologist! Charles (1967) gave an excellent review of the treatment of this type of iatrogenic injury. I have seen it in my own department following catheterization of the ureter and I think the modern disposable catheter is more dangerous than the customary one. Apart from ascertaining that no pathological lesion is present no treatment is needed.

Injuries to the Bladder,

Intra- and Extra-peritoneal

Sir William MacCormac (1886) wrote:

'Two cases of intraperitoneal rupture of the bladder have been recently under my care in St. Thomas's Hospital. In each case abdominal section was performed very shortly after admission, the rent in the bladder exposed, and carefully closed by numerous interrupted silk sutures. The cavity of the peritoneum was then thoroughly washed out with warm boric solution and the external wound closed. An uninterrupted recovery followed in both instances, the first, so far as I can learn, upon record.'

Fracture of the pelvis may be accompanied by injury to the bladder, extra- or intra-peritoneal or both. A full bladder may be ruptured by a direct blow or by muscular contraction of the rectus abdominis muscle. The incident is often associated with the taking of alcohol.

There is usually pain and tenderness with muscle-guarding in the lower abdomen. Repeated attempts at unsuccessful micturition are typical. If the bladder is distended the desire to urinate may temporarily disappear. Rectal examination will reveal a boggy mass masking the normal findings. Along with the routine hæmoglobin and blood group estimations, a cystogram is carried out, with the least disturbance to the patient, and supplies the most useful information.

Treatment: Treat 'shock'. There is no time for a 'wait and see' policy. Suspicion must lead to exploration; 48 hours delay will invite an irreversible cellulitis with peritonitis and death.

Through a low paramedian incision, the peritoneal cavity is explored and excess fluid is removed. Extensive oedema of the posterior bladder wall may mask the site of rupture. Do not waste time searching for the rupture; open the bladder, introduce a finger and a large rent will be found easily but the peritoneal perforation may still be difficult to localize. Nevertheless, one deep external catgut suture will suffice. If the rent is small there is no need to suture if adequate suprapubic drainage of the bladder is instituted for ten days.

Rupture of the Anterior Urethra

Morson (1941) said that injury to the urethra was the most serious of all injuries to the urogenital tract. There may be a long interval between the date of the injury and the onset of some lesion in the urinary tract directly attributable to the urethral damage but come it will. We have seen only 5 ruptures of the urethra in the past five years. I do not know whether man-holes are fewer in number or whether the covers fit better! Most cases resulted from straddle falls on blunt or spiked objects.

The diagnosis of rupture of the urethra from the history, the presence of perineal pain and swelling and meatal bleeding is usually easy. It is more difficult to assess the extent of damage to the urethra and to decide whether it is a partial or complete tear. The fact that the patient has urinated following the accident indicates a partial rupture; with a complete rupture it is most unlikely that the patient will be able to urinate. A urethrogram aids the assessment.

Treatment: If the patient has micturated and there is no undue perineal swelling, he should be left alone and confined to bed for a few days' observation. If a catheter can be passed, let it drain for eight days; a small Gibbon is ideal. If catheterization fails, the patient must be prepared for surgical intervention. Under anaesthesia a further attempt to pass the catheter should be made and it may now be successful. Nothing further is required except to decide whether the perineal swelling should be incised and the blood clot evacuated.

Failure at catheterization indicates the need for a suprapubic cystostomy to divert the urine and a perineal incision for exposure of the torn urethra. Any crushed or devitalized tissue should be excised. If the tear is partial, two chromic sutures will suffice to close the ends. A complete

Table 2

Cases with fractured pelvis

Year	No. of cases admitted with fractured pelvis	No. of cases with genito-urinary trauma requiring operation			
		Bladder	Urethra	Total	%
1962	36	2	1	3	8.3
1963	51	2	3	5	10.0
1964	38	2	2	4	10.5
1965	38	2	1	3	8.0
1966	34	3	1	4	11.8
Total	197	11	8	19	9.6

tear with separation sometimes presents difficulty in finding the proximal end but this can be brought into view by passing a bougie down the urethra from the bladder. One roof suture will secure apposition and I feel that little further should be done. With more extensive damage, Swinney (1963) advises suturing the urethral mucosa to the skin. The after-treatment of urethral bouginage commencing eight to ten days later is just as important as the initial treatment.

The response of the anterior urethra to trauma is unpredictable. We see stricture formation following catheterization or instrumentation in one patient and not so in another. Stricture formation may follow in spite of careful routine bouginage.

Rupture of the Posterior Urethra

There is no doubt that this injury is becoming more common, as the result of the increasing number of fractures of the pelvis. A rupture of the posterior urethra and/or bladder must be suspected in every pelvic fracture (Table 2). The diagnosis is made on the history and clinical findings. Blood-stained urine may be passed or there may be complete retention with a gradually distending bladder. Muscular guarding may mask this sign. Rectal examination will reveal bogginess or an 'absent' prostate. However, a urethrogram is of the greatest value and will reveal even a partial tear (Fig 3). Catheterization is unnecessary and should be avoided.

Young (1930) reported his experience with 9 ruptures of the posterior urethra. One only was a recent injury; the other 8 cases were weeks or months old. From his experience with these cases he says they show the importance of early operation and accurate repair of the urethral defect. In those cases where immediate operation was done, excellent results were obtained and the serious complications described in other cases avoided. In almost every case where the posterior urethra is ruptured, the safest procedure is to go in at once and do an anastomosis if the rupture is complete or close the defect over a catheter.



Fig 3 Urethrogram in a rupture of the posterior urethra revealing extensive extravasation

Wilkinson (1961) reviewed 12 cases of rupture of the posterior urethra. The treatment consisted of suprapubic cystostomy and immediate catheter splintage of the urethra. In the first six patients the urethra was merely splinted. In the second 6 catheter traction was added by the use of a Foley's balloon catheter. It was interesting to note the difference in the progress of the two series, particularly in regard to the early stage. Suprapubic leakage to a greater or lesser degree was present in all patients in the first series. Routine bouginage in the follow up was considered advisable. In the second series there was no suprapubic leak and micturition was satisfactory from the time of removal of the catheter. Eventually all but one patient had normal micturition and urethral bouginage has no longer been required.

There is always the probability that sexual function may be affected after rupture of the posterior urethra. It is not true, as is sometimes stated, that it is inevitable. We found the impotence permanent in 4 of the 12 patients and, although erections were not obtained, ejaculation was possible in 2 of these patients. There was no mortality.

Since 1960 we have treated a further 7 patients. In this series two deaths were associated with severe multiple injuries; one died from fat embolism and the other from renal failure in spite of repeated dialysis; in this patient renal angiography revealed what was considered to be cortical necrosis. The other 5 patients were

treated by the same catheter traction technique. The traction is light, the catheter being merely tied to a convenient point or to a plaster knee collar; none of the reported complications of this method has been experienced.

Operative Repair of Posterior Urethral Injuries

The operation is straightforward to anyone experienced in retropubic prostatectomy. A low paramedian incision is made. The bladder distension, indicating evidence of its integrity, is relieved by a stab incision. The retropubic space is cleared of blood clot, care being taken to avoid puncture of the finger on a sharp bone fragment, and the damaged area is brought into view. Loose bone fragments may be removed. The re-alignment of fragments still attached is difficult and their removal may produce copious hæmorrhage from neighbouring veins. A Foley's catheter F18 is passed down the penis (it may be assisted by an introducer) and its tip is palpated and the catheter drawn into the retropubic space; the tip is transixed with a long catgut suture. An 8/11 steel sound or curved Spencer Wells is introduced through the bladder stab incision and manipulated through the prostatic urethra into the retropubic space. The catgut suture is attached and the catheter drawn into the bladder. The balloon is distended and slight traction on the catheter will be seen to bring the urethral ends into apposition. Suprapubic cystostomy is undertaken with a large Foley catheter. The catgut suture which is brought out on to the abdominal wall provides a safeguard against displacement of the urethral catheter. This technique adds little time to the suprapubic cystostomy.

Mitchell (1963), with considerable experience of this lesion, advises a first-stage suprapubic cystostomy and reduction of any prostatic displacement. He avoids urethral instrumentation, which might lead to the introduction of infection. Three weeks later, a panendoscope is passed and the clearing of a soft-blood clot in the posterior urethra reveals a patent lumen. He feels that this is because most tears are incomplete. On only 3 occasions in 17 cases had operative measures been necessary to overcome a posterior urethral block.

Our experience is that most tears are complete. Only 2 patients in our series got urethral strictures; they occurred when urethral splinting had not been done or when the catheter had been removed too early. Neither of these cases could be said to conform to Mitchell's criteria. The first, a boy aged 11, was referred to me, leaking suprapubically and dribbling from the urethra; eventually his posterior urethra was reformed by an epithelial inlay graft, with the help of our plastic surgeon, Mr Andrew McDowell. The boy was in hospital off and on for three years, during which

time his left kidney had to be removed for infective calculous hydronephrosis. Now, at the age of 20, his urinary tract is functioning normally.

In the second case, the surgeon had found it impossible to splint the torn urethra and the patient was left with a suprapubic cystostomy. Exploration at a later date revealed extensive fibrosis. With difficulty, the two ends of the urethra were found but an attempt at mobilization made little impression, although the gap was reduced. Catheter splinting was instituted for three weeks. He was then able to micturate but has to return for monthly dilatations. He is now awaiting a Badenoch pull-through operation. Fortunately his upper urinary tract is radiologically normal.

Injuries to the Scrotum

War injuries: Injuries to the scrotum figured prominently in the casualties of the Burma Campaign. Many were of an accidental nature: troops crawling in file along the treacherous slippery jungle trails could and did receive GSWs from the Sten gun, a weapon dangerous alike to friend and foe, carried by the man crawling behind. By the time these casualties were received at the base hospitals, the remaining portions of the external genitalia were on their way to complete healing thanks to the excellent work of the Field Surgical Units and to the excellent healing properties of these parts.

Civil injuries: A hæmatoma of the scrotal wall, if large, requires incision and evacuation of the clot; a small hæmatoma will resolve spontaneously. If there is any suspicion that a hæmatocele is present, the tunica vaginalis must be opened. On two occasions a rupture of the testis was seen and repaired; in each the testis was later found to be normal (Dundon 1952, Laird 1954). If the hæmatoma is not evacuated, it gradually forms a large fibrinous mass around the testicle leaving as a legacy the problem of a scrotal tumour to be solved only by orchidectomy.

Torsion of the testis is usually misdiagnosed as epididymitis, but there is occasionally a history of trauma, as it usually occurs in teenagers. Allan & Brown (1966) described 58 cases explored in our department. One followed a blow: thrombosed spermatic vessels necessitated orchidectomy. A lad was seen recently with a definite history of a blow followed by a painful scrotal swelling: a diagnosis of secondary hydrocele was made. The swelling rapidly subsided but six weeks later he returned because of recurrence of the swelling and pain. Exploration revealed a gangrenous testicle which was removed; the other testicle was fixed. Recurring mild attacks are typical of the condition.

Perineal hæmatoma: On two occasions incision and drainage of perineal hæmatoma was followed by profuse recurrent hæmorrhages. In neither case was there a urethral rupture appreciable either clinically or radiologically. The perineum in each case was reviewed and it appeared that the bleeding came from torn corpora cavernosa. It was most difficult to control this bleeding without packing, one patient receiving 10 pints of blood in his resuscitation. Eventually, both made a complete recovery. Following this experience, a third case of perineal hæmatoma was not explored but kept under observation and the swelling gradually absorbed. The three accidents occurred in young men and one wonders whether stilbæstrol therapy would help to subdue the engorgement of these vascular parts.

The Zipper Syndrome

The zipper syndrome, whilst certainly not of a serious nature, is undoubtedly most painful. A few months ago, howls from the Casualty Department attracted my attention: they came from a boy of 7 years whose prepuce had been enmeshed in the zipper of his shorts. By means of a pair of pliers he was freed and a collodion spray completed his treatment. A nursing sister tells me that nylon zippers have brought her more problems in the Casualty Department of a Wiltshire General Hospital than any other contribution to urological injuries.

Acknowledgments: I should like to take this opportunity to pay tribute to my Registrars, now scattered over the face of the earth, who have assisted me or have themselves operated on and cared for these patients. I also thank my surgical and radiological colleagues and the Accident Team at Preston Royal Infirmary, Mr R S Garden in particular, for their co-operation and help.

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Meeting November 23 1967

The following cases were shown:

Panurothelial Carcinoma

Mr Grant Williams (for Mr David Wallace)

**Malakoplakia of Bladder Producing
Ureteric Obstruction**

Mr R W Lloyd-Davies

(for Mr K E D Shuttleworth)

(1) Renal Tuberculosis and Hypertension**(2) Renal Amyloid Disease**

Mr R E Williams and Dr C K Anderson

Wedding-ring Gangrene of Penis

Mr M Singh (for Mr J P Blandy)

Appendicovesical Fistula

Dr J Steen

(for Mr J P Blandy and Mr C V Mann)

**Obstruction of Mid-portion
of Transplant Ureter**

Mr H J O White

(for Professor R Y Calne)

Spontaneous Disappearance of Renal Cysts

Mr P McR Higgins

(for Mr D M Wallace

and Mr G C Tresidder)

(1) Papillomata of the Ureter**(2) Epidermal Carcinoma of the****Renal Pelvis**

Mr N Sherson

(for Mr D G Lambley)

Retrocaval Ureter

Mr R A Mogg