Haemodynamic Change During Transurethral Resection Of The Prostate

THESIS

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بسم الله الرحمن الرحيم

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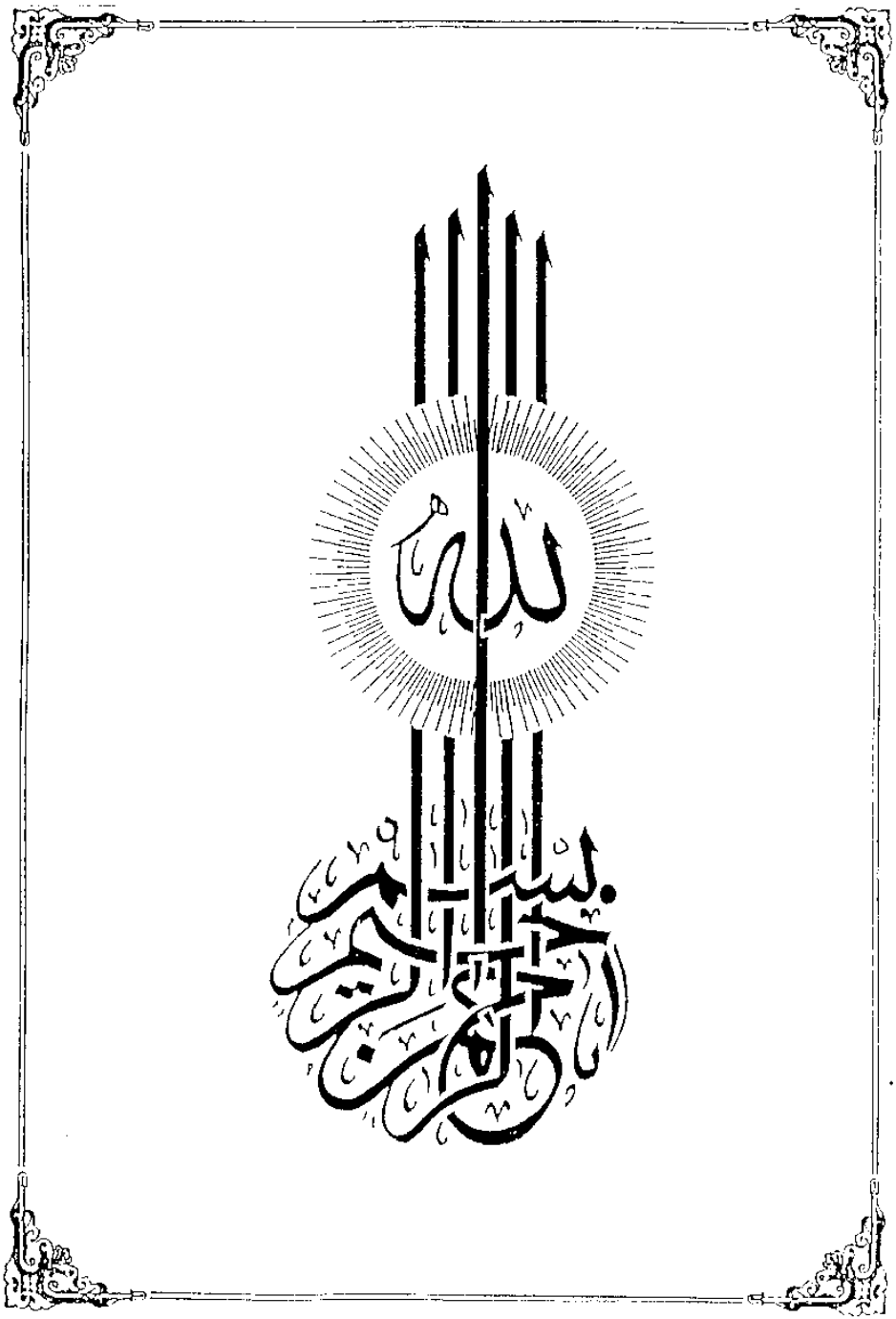

TO ...

MY WIFE..

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INTRODUCTION

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The endoscopic operative urology consists of an interesting study in the advances achieved in the principles of aseptic and antiseptic urology, the progress in optical physics, the development of and the improvements in the electric light source, and finally the rapid advance in the knowledge of electronics. Transurethral resection can be traced back over 100 years, when the earliest operations were performed with ingenious instruments using hidden or retractable blades, resembling the old bistoury. There was no illumination, no optical system, and the effect of electrical currents on the tissues was unknown.

Even before this, Pare Ambriose (1575) used a gimlet to remove stone impacted in the neck of the bladder. The instrument was intended to break up the stone and then drill open the neck of the bladder. So to Pare must go the credit of the first description of any attempt to transurethral cutting of tissues in the region of the bladder outlet. Guthrie (1934) invented an internal urethrotomy knife to relief of bladder neck obstruction.

Civiale (1850) suggested cauterization of the bladder neck by a bougie to the tip of which beeswax impregnated with caustic had been applied. This was left in contact with

the obstruction at the bladder neck, which then dissolved and healed with a satisfactory scar.

In 1890 the italian surgeon Bottini presented the results of his galvanocautery at the International Medical Congress in Berlin. At the same time (1890) Clarke appreciated the need for careful selection of the small obstructive prostate for galvanocautery.

Clarke illustrated Bottini's instrument in detail (1892) with its hook to locate the bladder neck and its lever to expose the cauterizing blade of platinum, which was healed heated by a battery for 50 seconds to burn the bladder neck and prostate. The tube of the instrument was divided into two channels, so that water could circulate down on and out via the other to cool the site of the cauterization.

In 1909, Young used his urethroscopic median bar incision, and carried out his first punch prostatectomy. Similar procedures were carried by Bugbee (1913). In 1922, transurethral surgery was well established in America by Deaver and Herman. Rose (1925) was the first to attempt haemostasis after prostatic resection using a cautery via his punch.

Walker described his instrument with a bakelite sheath in the United Kingdom in 1925. In 1926, Collings described

his method of incising the obstruction at the bladder neck, using his knife activated with a damped high frequency diathermy current via a panendoscope, and stream, in the same year, presented his machine for resecting the bladder neck by means of tungsten loop, controlled by ratchet. This was the first description of an attempt at removal of more than just the middle lobe of the prostate on median bar. Since then there have been various modifications of the moving carriage (McCarthy, 1931; Nesbit, 1939 and Baumrucker, 1946). The sizes of gland removed were steadily increasing until, in 1948, Iglesias de la Torre reported a record resection of 250 gram, which he claimed to have removed at one sitting, using his own modification of the resectoscope. In fact, there is probably no limit to the size of the prostate gland that can be resected (Blandy, 1971).

Though the abbreviation. T.U.R. has been accepted on both sides of the Atlantic, the scholar of English will find the prefix "trans" unacceptable for an operation which is performed through the urethra and not across it. For this reason many attempts have been made to preserve the term "per-urethral resection", but despite the great accuracy of this terminology popular usage demands the word " trans-urethral".

The good craftsman in endoscopic surgery is automatically assessed by the onlooker on the amount of

removed tissues and from the quantity of blood in the washout during and after the operation. Without doubt the most essential skills required by the resectionist are the ability to orientate accurately and without delay the bleeding point and achieving haemostasis throughout the procedure. The principles of haemostasis (Mitchell, 1972) are also technical skill demanding considerable endoscopic experience. In open surgery, a variety of options are available to the surgeon, from simple pressure on the bleeding points to ligaturing, oversewing, diathermy forceps coagulation and even the application of haemostatic agents in the form of gels. In trans-urethral surgery haemostasis can be achieved by only one mean and that is accurate localization of the bleeding point and the application of diathermy coagulation. If a true bloodless resection could be achieved without any drop in blood pressure there would be no contra-indication to transurethral resection as an outpatient procedure even the most decrepit patient. Every stage of the technique, preoperative, operative and postoperative is orientated directly or indirectly towards the objection of satisfactory haemostasis.

The principle of transurethral diathermy resection is the removal of tissue from the bladder, prostate, or occasionally the urethra, by means of an instrument passed via the urethra. The tissue is cut by the passage of a high frequency short wave diathermy current which is transmitted through the patient. The most convenient shape of electrode

for resecting is a loop, which cuts the tissue in small slices or chips. These fall into the base of the bladder and then can subsequently be washed out by irrigation with an instrument such as an Ellick's evacuator.

The operation is controlled by direct observation via the telescope, with some degree of magnification (X4). The bleeding points can be seen and coagulated by diathermy with great accuracy, provided the surgeon has studied meticulously the skill of haemostasis under endoscopic control.

The size of the gland is never the factor on which the decision to perform prostatectomy is made (Blacklock, 1976). It is merely the factor that decides the route by which prostatectomy will be performed. A small gland can create as much obstruction as a large gland. For example, a small gland with a thick and rigid capsule and a tight bladder neck will cause obstruction at a very early stage in hypertrophy, whereas if the capsule is thin and the bladder neck is distensible, then the prostate can enlarge to the size of grapefruit before it gives rise to true obstruction (Mitchell, 1970).

Following prostatectomy, whether performed by open surgery or by transurethral resection, small tags of adenomatous tissue or even remnants of apical lobes may be left behind and those are very easily cleared by the

transurethral route (Hanley, 1960). Not infrequently resectionist is presented with a patient in whom a false passage has been created some where in the region of the prostate gland.

The disabilities from this false passage can vary from urinary incontinence to intermittent obstruction, or even retention. This symptom can be relieved by resecting the bridge of tissue between the posterior urethra and the false passage, and thereby saucerizing the area. This is virtually impossible by open surgery (Barnes, 1962).

The problem of contraindication, apart from general fitness for surgery, must be considered. The passage of an instrument via the urethra when it is acutely inflamed is liable to give rise to absorption of organism through the urethral mucosa with resulting bacteraemia (Mitchell et al., 1962).

Transurethral surgery should therefore be delayed until the urethritis has responded to treatment. Similarly, an epididymitis, which is often associated with inflammation within the prostate gland, should be allowed to settle before attempting to resect prostatic tissue, otherwise there is a district risk of spreading the infecting organisms to the epididymis of the opposite testis (Alyea, 1928).

As with infection of the urethra, so a cystitis with infected urine should be allowed to settle with chemotherapy prior to attempting to instrument the urethra. Infections of the bladder almost certainly mean infection of the urethra as well and therefore instrumentation is liable to result in bacteraemia (Mitchell, 1964).

Stricture of the urethra can be dilated. On the other hand a transurethral resection as long as one hour, while the sheath of the instrument constantly oscillates in the line of the urethra, can cause its further damage and irritation. Though, a tight stricture can very well be a contra indication to the transurethral approach and an indication for open surgery (McEachern, 1957).

The small hypertonic bladder seen where the bladder wall is grossly hypertrophied can complicate a transurethral resection by the need for frequent emptying of the bladder. If the capacity is less than 250 ml the number of cuts with each viewing can be reduced to a quarter. If the bladder is allowed to fill to its limit of 250 ml then there is an increased risk of forcing fluid into the venous sinuses and also a possibility of aggrevating the bleeding by stretching the coagulated ends of vessels, which then reopen and bleed again.

Care must be taken to observe the landmarks, as a collapsed bladder wall can occasionally be mistaken for part

of the prostatic cavity and the inter ureteric bar can occasionally looks like the bladder neck as the bladder fails to distend. The presence of calculi, diverticulum, or even a neoplasm of the bladder can influence the decision as to whether to approach the prostate transurethrally or by open surgery (Barnes, 1962).

Occasionally, a large irreducible scrotal hemia may be an embarrassment to T.U.R.
On the other hand, a sliding hernia, in which part of the bladder slides down beside the bowel, can cause that part of the bladder wall to escape the resectionist as the viscus fills with irrigating fluid. A head-down tilt of the table may help to reduce a large hernia and keep it under control for the period of the resection (Moore, 1952).

Surgery to the prostate should be delayed until the acutely inflamed haemorrhoids have subsided. Any attempt at transurethral resection while the haemorrhoids are still acutely inflamed, could result in heavy bleeding from the general congestion of the pelvic tissues due to dilatation of the various venous plexuses around the prostate (Nesbit & Conger, 1941).