

Cutting for the Stone

Victor G. Griffiths

Stone in the bladder was a common affliction throughout Europe until the early years of this century when for reasons possibly dietary but still obscure it became very much less frequent especially in children.

The operation for its removal, 'cutting for the stone', or lithotomy, is one of the very oldest in Surgery, and indeed, in the many centuries of the pre-anaesthetic and pre-Listerian era, lithotomy was one of the very few 'cold' or elective operations to which man submitted, the distressing features of the malady out-weighting the hellish torments and the mortal risks of the operation.

For fairly obvious reasons of relative accessibility and safety, the perineal approach to the bladder was the original and the classical one, and it is to PERINEAL LITHOTOMY that I shall confine myself in this account. The position in which the patient was placed, securely bound or forcibly held for the operation remains as an unforgettable feature of surgical vocabulary even though we now use it for other perineal procedures.

Perineal Lithotomy was certainly practised in Ancient Egypt and in India, and the earliest account by Susruta in the Ayur-Vedic canon though of uncertain date may well go back to centuries before Christ. The Hippocratic oath contains the well-known injunction to leave the operation only to those who were specially versed in it. CELSUS who lived from 25BC to 50AD gives a detailed description in his Seventh Book, as does Rufus of Ephesus, who flourished in Alexandria in the first century AD. Antyllus in the third century and Paulus Aegineta in 625AD describe it in very similar terms. The operation, like most of the medical and other scientific lore of the time, passed into the hands of the Arabs, and it reappears in Europe in 1363 through GUY DE CHAULIAC. The operative technique we are speaking of, whether termed the Methodus Celsiana or Methodus Guidoniana, was later termed the APPARATUS MINOR since it entailed the use of a bare minimum of instruments viz. the cutting knife and hook. The operator, with two fingers in the rectum of the patient, held the stone against the perineum, and then made a transverse cut between the scrotum and the anus directly on to the stone and into the bladder, from which the stone was then pushed or hooked out. Hence, the method was also known as Cutting on the Grip. For obvious anatomical reasons it succeeded best in pre-pubertal boys, and in fact Celsus restricted it to the 9 to 14 age group.

We come now to a more elaborate and more successful development of the operation entailing the use of a number and diversity of specially designed instruments and hence known as the APPARATUS MAJOR including a grooved STAFF (hence *cutting of the staff*), a GORGET, extracting forceps etc.

Itinerant quack lithotomists known as the Norcini or men from Norcia in Umbria may have been performing it thus in the 14th century, but the authentic accreditation must go to Battista da Rapallo about 1500 (died 1510). He taught it to Giovanni dei Romani, who was born in Casale and practised surgery in Cremona, who in his turn described it in letters to MARIANUS SANCTUS of Barletta, from whom it derived the name of METHODUS MARIANA. A printed account by Marianus may be dated to 1522 but received little or no publicity. Its next notable exponent in Rome was Ottaviano Da Villa (died 1556), from whom the secret knowledge passed to a family dynasty in France, the Collot: the first of these, Laurent of Trainel in Champagne, was given royal recognition in Paris by Henry II; a successor Philippe achieved the highest reputation for the operation, and had it performed upon himself by his own son; and last of the line, Francois, published the method (posthumously) in 1706.

This original method of cutting on the staff must be distinguished by the name of the Median Cut because the urethral sound or staff was held in the midline, while the vertical incision in the perineum, just to the left of the midline, was carried through into the membranous urethra and the middle of the prostate and thus into the bladder; the cutting knife was followed into the wound by the surgeon's probing finger and the dilating gorget, and finally by the extracting forceps. Its main advantage lay in the avoidance of major blood vessels, but the incision through the prostate and into the bladder was necessarily small and attempts to enlarge it often injured the rectum. With modification, mostly by Marechal and Vacca Berlinghieri, it retained some favour with some surgeons to survive till about 1832, but in the 18th century was largely abandoned for the LATERAL Cut.

In the Lateral Cut the deep part of the staff in the urethra and bladder is deflected towards the left half of the perineum and the cutting knife is thus guided to cut laterally into the base of the bladder or, preferably, through the urethra and prostate into the bladder, allowing of a wider access to the bladder and of a less sensitive route for the extraction of the stone.

This method may have originated, at least as to theory, with Pierre Franco (1500-1565) of Turniers in Provence who has a claim to priority for suprapubic lithotomy and for operating on strangulated hernias. The renowned Fabricius Hildanus (Wilhelm Fabry of Hilden, 1560-1634) certainly practised it. His book *Lithotomia Vesicae* was of such renown that Scultetus in the 'Armamentarium chirurgicum' has no more to say about lithotomy than to refer his reader to Hildanus' 'absolutissimus tractatus'.

The lateral cut achieved lasting renown through and is best associated with FRERE JACQUES. Jacques Baulot, of obscure origins, became associated with Pauloni, an itinerant Italian lithotomist, and eventually changing his name to Jacques de Beaulieu and bestowing on himself a pseudo-monastic habit and title, appeared on the surgical scene at Besancon in 1695, thence to be quickly recommended to Paris. There, his first demonstration of his method of lithotomy on the cadaver receiving favourable report, he was allowed to operate at the Hotel Dieu. Inevitably, his results suffered the vagaries of fortune and he left Paris under a cloud. To his credit, he improved on his method by adopting the channelled staff and particularly by seeking some instruction in anatomy from Fagon, Louis XIV's physician, and from Hounault of Angers. He returned to Versailles in 1701 to win numerous successes and royal favour and acclaim. In 1704 he operated in Holland and elsewhere. His method was given to the world in print by Hounault in 1701, and by himself in 1702. He was credited with some 4,500 operations till his death on 16th December, 1714, and probably had a lower mortality rate than any of his predecessors or contemporaries. A colourful and controversial figure, whose early operations were anatomically haphazardous and early successes fortuitous, he deserves lasting renown for learning from his mistakes, for his modesty in claiming results and for his non mercenary attitude to his profession.

Frère Jacques' successor was the German Rau, born in 1668, who practised in Leyden and Amsterdam, where he had very good results in over 1,500 cases in 15 years. He invariably used the grooved staff and cut precisely into the neck of the bladder; Frère Jacques praised him to the magistrates of Leyden as more able than himself. Although an account of his method was published by Albinus in 1725, Rau tried to keep his techniques a secret which awaited a few years for re-discovery.

**Victor G. Griffiths M.D., F.R.C.S.,
The Medical School, G'Mangia.**

This was achieved and improved upon by William CHESELDEN who is acknowledged to be the true master of the Lateral Cut. Cheselden who lived from 1688 to 1752 and practised at St. Thomas's Hospital stands in the front rank among anatomists and surgeons of his time. By 1731 his renown as a lithotomist was such that the Academie des Sciences sent Morand to London to study Cheselden's method. Cheselden has left his own account as an appendix entitled, 'A short historical account of cutting for the stone' at the end of his 'Anatomy of the Human Body'. Having described his first experiences with suprapubic lithotomy, following the re-discovery of the operation by John Douglas, he goes on to say how he studied what was known of the methods of Rau and made a definitive return to the Perineal route, perfecting the true lateral cut upon the grooved staff 'in that part of the urethra which lies beyond the corpora cavernosa urethrae, and in the prostate gland, cutting from below upwards to avoid wounding the gut; and then passing the gorget very carefully in the groove of the staff into the bladder'. Of his results he says, 'What success I have had in my private practice, I have kept no account of, because I had no intention to publish it, that not being sufficiently witnessed. Publicly in St. Thomas's Hospital I have cut 213; of the first 50, only three died; of the second 50, three; of the third 50, eight; and of the last 63, six ...'. Apart from his relatively low mortality and his unrivalled speed in operating (usually under one minute), Cheselden's results were a great improvement in morbidity and complications, matters which rarely feature prominently in the accounts of those times; his success must be attributed as much to his dexterity with the knife as to his sureness of touch with the probing finger guided by exact anatomical knowledge of the relations of the rectum and other vulnerable parts.

Those who followed Cheselden, notably Moreau, Lecat and Pouteau had little to modify in his method except in trying to ensure that the deep cut did not extend beyond the lateral limits of the prostate. Others tried to achieve this factor by modifying the instruments used, this culminating in the ingenious adjustable 'lithotome cache' of Frere Jean de Saint Come, a Franciscan friar in Paris (1803-1881). But before this, a simpler safe instrument for making the deep cut through the prostate was invented by Sir Caesar Hawkins of St. George's Hospital and by Henry Cline of St. Thomas's by providing the Gorget with a cutting edge. A further modification came with the Double Gorget (Fig. 1) invented by William Bromfield (1717-1792) of St. George's Hospital, also renowned as the founder of the Lock Hospital. Bromfield's double gorget had a second cutting blade to slide in grooves within the original blunt dilator. He published in 1761 in Florence his 'Observationes ad lithotomiam atinentes aliaque chirurgiae monumenta'. William's elder

son, William Heriot Bromfield, was an MD of Padova.

This brings us now to the School of Anatomy and Surgery of the Sacra-Infirmeria of Valletta, or rather to its most notable luminary MICHELANGELO GRIMA (Fig. 2, 3). In the February 1761 number of the 'Journal de Medicine, Chirurgie et Pharmacie' of Paris, Grima published his 'Reflexions sur la memoire sur la taille laterale de BROMFIELD', which was translated and reprinted in Florence in the same year (Fig. 4).

Grima writes that Bromfield Junior lent him the instruments used by his 'celebrated' father. Either in Paris, whereto Grima had repaired from Florence in March 1759, or in Cassel where Grima spent two years as surgeon with the French army in the Seven Years War, Grima used Bromfield's instruments in operating on some cadavers. He sent an account of these experiments to Bromfield Junior, who informed M. Vandermonde the author of the Journal de Medicine who had also witnessed the operations. Grima describes briefly how he used the instruments, particularly the Double 'Gorgeret', and says that the method is the same as Cheselden's, only perfected and made safer. He describes Cheselden's procedure in making the deep cut with the scalpel, whereas Bromfield's method makes the cut with the gorgeret. Grima claims that with Cheselden's method, the grooved staff

being held by an assistant, the point of the knife may leave the groove and cut some large branch of the internal iliac artery with serious haemorrhage; also, that Cheselden's cut might involve the ejaculatory ducts of the left seminal vesicle. Grima claims that the double gorgeret properly used should ensure complete safety from wounding the rectum, and that it should cut the neck of the bladder in a less sensitive area. After adding a few other technical details on the use of the



Fig. 1 - Bromfield's double cutting Gorget

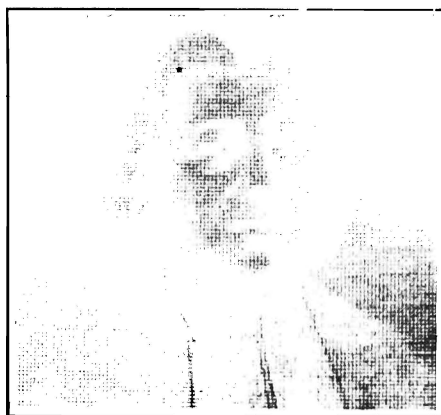


Fig. 2 - Michelangelo Grima. Portrait, possibly contemporary, formerly in the Aula Magna of the University



Fig. 3 - Michelangelo Grima. Bust presented to him by the Academy of Florence in 1773

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RIFLESSIONI
DEL SIG. MICHELANGELO GRIMA
 SOPRA IL TAGLIO LATERALE
 Che per estrarre la Pietra della Vescica
 ordinaria pratica

IL SIGNOR GUGLIELMO BROMFIELD
 PRIMO CERUSICO DI S. A. R.
LA PRINCIPESSA DI GALLES
 e Chirurgo degli Spedali di San Giorgio,
 e di Locke in Londra &c.

*Estratto dal Giornale Florentino di Medicina, Chirurgia, Farmacia &c.
 del Mese di Febbraio 1761.*

 **L Signor Guglielmo Bromfield**,
 il Figlio, addottorato in Medicina
 a Padova, mi ha prelati gli
 Istrumenti, che il celebre suo Sig.
 Padre adopra per estrarre la pie-
 tra della vescica. Alla preferenza di più Medi-
 ci, e di più Cerufici, ho fatte con detti Istru-
 menti alcune operazioni sopra dei cadaveri.
 Accomodati questi secondo il bifogno dell'o-
 pe.

Fig. 4 - Michelangelo Grima's 'Reflections on the Lateral Cut'

double gorgeret, he refers to Bromfield's four-branched extracting forceps and ends with a mention of a 'Lithotome cache' which, however, he does not prefer to Bromfield's gorgeret.

Grima returned to Malta in 1763 to take up at the Sacra Infermeria a brilliant career as Anatomist and Surgeon till his retirement in April 1797 and his death on the 25th August, 1798.

In the 'Reflexions' above-mentioned, Grima has the following passage: 'With M. Cheselden's method I have seen many operations done by Grilliet, the Maltese lithotomist and a pupil of M. Morand'. He must have been referring to Giuseppe Grilliet, a surgeon at the Sacra Infermeria during Grima's years of apprenticeship there from 1743 (aged 12) till 1750 when he left Malta for Santa Maria Nuova Hospital of Florence. We have already mentioned the link of Morand with Cheselden. Grilliet has been termed a 'celebrated' lithotomist. Well before his time and Grima's, lithotomy must have been a well-established operation at the Infirmary because their predecessor, Gabriele Henin, is described as Chief Lithotomist. I have yet to discover when lithotomy was first practised at the Infirmary, and by what method. Grilliet's son Michele was also a lithotomist and a prominent surgeon for 50 years, though Grima was given preferment over him in appointment as Chief Surgeon to the Infirmary. We have but one other fragment

of information about Grima and lithotomy. In an entry for the 9th November 1772 of a diary kept by a Canon Agius (a relative of Agius de Soldanis) it is related that two operations for the stone were performed at the Infirmary: 'one by a French master took seven minutes and the patient survived 32 hours, while the other performed by the celebrated Grima lasted two and half minutes and the patient remains alive and merry'. We thus have contemporary and direct testimony that Grima was almost in the Cheselden class for expertise and celerity. That record holder among Surgeons of the pre-anaesthetic era for speed and boldness, Robert Liston, wrote many years later that lithotomy 'should not occupy more than two to three minutes at most'. But an operation lasting 55 minutes, and terminating fatally, by Bransby Cooper, the nephew of Sir Astley Cooper at Guy's on the 18th March 1828, was the occasion of a famous libel suit against Thomas Wakley, the firebrand founding editor of the *Lancet* - while the great and gifted Sir Astley himself has left a graphic description of another terrible hour long struggle with a giant stone.

It remains to say that the cutting gorget, if not always Bromfield's double instrument, became generally popular in England and Germany, though the French tended to prefer the elaborations of Frere Come and the Baron Dupuytren. It is also of some interest that the first perineal lithotomy under Ether Anaesthesia was performed on 25th January, 1847, at the Middlesex

Hospital by James Moncrieff Arnott, of the Arnott Demonstrations of the R.C.S.

Perhaps not the least fascinating aspect of the history of this operation is that it is probably unique in having inspired the composition of a piece of music by Marin Marais (1656-1728), chief player of the bass viol at the court of Louis XIV and a worthy follower of the more renowned Lully. Marais composed this graphic piece of programme music entitled 'Operation for the Removal of a Stone' and on the original copy inserted a running commentary for a speaker to describe the harrowing scenes of the successive steps of the operation, ending however on the hopeful note of 'Convalescence'.

Professor Harold Ellis in his bright little book on 'A History of Bladder Stone' says of Perineal Lithotomy that in the 1890's it still featured in Treves's 'Student's Handbook of Surgical operations' - and that in 1924 a Colonel in the Indian Medical Service still recommended it. He ends by saying that it 'is now probably seldom if ever performed anywhere in the world'. However, those with an interest in the Curiosa et Exotica of Medical History may be interested to know that in 1968, I myself, at St. Luke's Hospital performed perineal lithotomy on a youth who had formed a large stone in the bladder after multiple fractures, and I described the case at a meeting we held with the surgeons of the Moynihan Travelling Club. I called my account 'Remembrance of Things Past'.

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