



“MODIFICATIONS AND THEIR MAGIC” COMPARATIVE STUDY BETWEEN GALDAKO MODIFIED VALDIVIA V/S BART'S FLANK FREE POSITION WHILE PERFORMING PERCUTANEOUS NEPHROLITHOTOMY AT OUR INSTITUTION.

Urology

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ABSTRACT

Renal calculi have always affected the human life throughout the history of medicine, with a description of it as early as 600 B.C in 'The Ancient India' by Sushruta¹. It is the pain and complications caused by these stones that has led to innovations in the field of Percutaneous Nephrolithotomy (PCNL). 1987, Gabriel Valdivia introduced the supine position which became popular in 2007 after its modification by Galdako, which allowed simultaneous retrograde access to the upper tracts also. To which there was modifications done and Bart's Flank free position came into existence. As the current literature doesn't have any consensus on which position is superior. Hence, the aim of our study is to determine the surgical outcomes of patients undergoing PCNL in these 2 positions.

KEYWORDS

Galdako Modified Valdivia's position, Bart's Flank Free supine position, Percutaneous Nephrolithotomy, Better position.

INTRODUCTION:

The human race had a tough time with urinary calculi over ages. Even inspection of Egyptian mummies had revealed the existence of kidney stone disease. The agony of renal stones is so bad that it is used as a metaphor in many proverbs such as *"THIS TO SHALL PASS, IT MAY PASS LIKE A KIDNEY STONE, BUT IT WILL PASS"*. It is this pain that gave rise to innovations in the field of surgery for renal stones, 1976 saw the evolution of percutaneous nephrolithotomy (PCNL) after which it has become the touchstone for huge and complex renal calculi².

The Prone PCNL procedure has its advantages, but also has disadvantages related to anesthesia, body mass index (BMI) and change in position during the surgery. As a result, this led to the search of several different positions for PCNL, which included complete supine and modified supine as they offer benefits over the prone position such as reduced cardio-respiratory difficulties, less radiation exposure by the surgeon, less punctures and major advantage was no need for repositioning of the patient in the midst of the procedure⁷. Supine position gained popularity by 2007 after Galdako modified Valdivia' position was invented, after which in 2012 came the Bart's flank free modified position which helped in getting simultaneous retrograde approach to the upper tract as well. This dual approach was useful in cases of staghorn calculi along with ureteric calculi thus operating them at the same time. Hence, comparison of the two positions is the need of the hour as there is a scarcity of data comparing the positions and literature gives us no clear consensus about which position is greater than the other. Hence, we decided to do this study to comprehend the surgical conclusions of these two positions in patient who were operated for PCNL.

Table 1 : Showing History Of PCNL Positions.³

SR. NO.	YEA R	POSITION	TYPE	ADVANTAGES/ DISADVANTAGES
1	1976	'Classic Prone {Fernston}' ¹	Prone	Larger surface area for puncture and closest approach to the kidney. Disadvantages: include anaesthesia issues, change in position and positional pain.

2	1987	'Original Supine (Gabriel Valdivia)'	Supine	Potential ergonomical and anaesthetic benefits & reduced the risk of complications associated with prone position.
3	2007	'Galdakao's Modified Valdivia'	Supine	Made supine easier and interesting
4	2008	'Bart's Technique'	Flank	It had a very good antegrade and retro grade access
5	2012	'Bart's Flank Free Modified'	Supine	Best flank exposure, also allows retrograde access into the ureter at the same time.

AIM AND OBJECTIVES:

I. To study the outcome of the two different positions based on multiple parameters such as:

- Number of punctures
- Complete Clearance rate
- Conversion rate
- Residual stone and if second sitting required
- Ergonomical benefits.

II. To compare the efficacy and safety profile between the two positions.

III. To understand the advantages of each position over the other.

METHODOLOGY:

Comparative observational study carried out on 40 patients over a period of 6 months in our institution.

Eligibility Criteria:

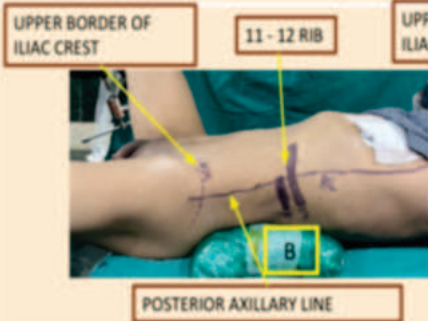
a. Inclusion Criteria:

1. Patients with renal calculi who are planned for PCNL.
2. Size of stone between 1.5 - 3 cm.
3. Hounsfield unit (HU)- 1000-2000 HU.
4. Age above 18 years.

b. Exclusion Criteria:

1. Patients with absolute contraindication to PCNL.
2. Patients who are unfit for surgery.

Table 2: Showing Difference Between The Two Positions.

POSITION	GALDAKO MODIFIED VALDIVIA POSITION(GMV)	BART'S FLANK FREE SUPINE POSITION (BFF)
Surface markings:		
Position description:	- Supine position . <u>Leg</u>: Ipsilateral extended, contralateral abducted and flexed. <u>Single large bolster</u> placed below the ipsilateral flank area. <u>Ipsilateral arm</u> placed over the chest and the contralateral arm by the side of the head. <u>30 degree</u> ipsilateral rotation of the chest achieved by tying the ipsilateral hand on the other side.	- Supine position <u>Leg</u>: Ipsilateral extended, contralateral abducted and flexed. <u>Small bolster</u> placed below the ipsilateral pelvis and <u>large bolster</u> placed below the ipsilateral chest leaving the FLANK AREA free. <u>15 degree</u> ipsilateral rotation of the chest achieved by tying the ipsilateral hand on the other side.
Position surgeon:	Sitting ipsilateral side	Sitting ipsilateral side.

Patients who fulfil the inclusion criteria were numbered as per their admission Performa filled consent taken after which they were divided into 2 groups:

Group 1: Bart's Flank Free Supine Position (BFF) {Even numbers}

Group 2: Galdako Modified Valdivia Position (GMV) {ODD Numbers}

Intra- Operatively:

Cystoscopy was done ureteric catheter was placed and then patient was given BFF position or GMV position according to the numbering done. All intra operative finding were noted and post operative complains were also noted.

DJ stent was placed for every patient and PCN in some patients.

Foleys was removed on POD-3 and patient was asked to follow up after 21 days for DJ Stent removal. Follow up done up to 2 months postoperatively.

All this data was evaluated and compared.

RESULTS:

1.Number of Punctures

Number of Punctures	Given Position	
	GMV	BFF
Mean (SD)	3.44	2.96
Median (IQR)	2 (1-3)	2 (2-4)
Min - Max	1 - 6	1 - 4

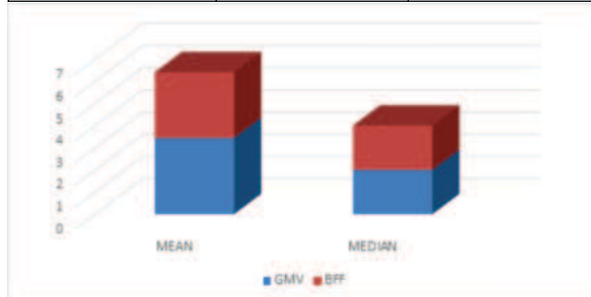


Chart 1: showing that mean and median in a graph

2. Stone Clearance Rate:

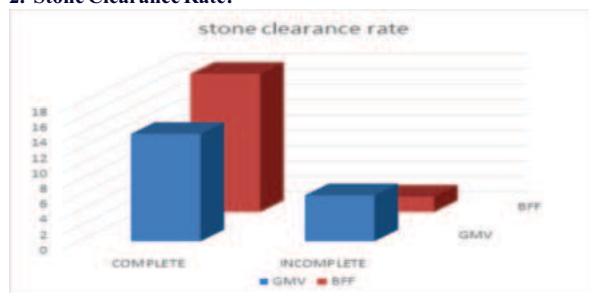


Fig 2: showing stone clearance rate.

Stone Clearance	Given Position	
	GMV	BFF
Complete	14 (70%)	18 (90%)
incomplete	6 (30%)	2(10%)
Total	20	20

3. Position Of Stone:

Position of Stone	Given Position	
	GMV	BFF
Upper	3	2
Middle	6	8
Lower	3	2
Partial Staghorn	5	4
Complete Staghorn	3	4
Total	20	20

4. Hounsfield Unit.

Hounsfield Unit	Given Position	
	GMV	BFF
1000-1500	7	8
1501-2000	13	12
Total	20	20

5. Both positions were operated under Spinal anesthesia.

6. Retrograde access are good enough, but in GMV because of the bolster in the flank area access at upper ureter is slightly tight and sometimes difficult too.

7. Operative Time: GMV > BFF

8. Post-Operative Pain: GMV = BFF

9. DJ stents was put in all cases and nephrostomy tube was placed in 2 cases of GMV as both were planned for a second sitting in Prone position to achieve complete clearance.

10. Hospital stay: mean 3.5 days both positions

11. Incomplete clearance cases: RIRS or Prone PCNL was carried out to attain complete clearance.

12. Track length appears to be slightly longer in BFF as compared to GMV.

13. Ergonomical difference:

GMV	BFF
Flank area is blocked by the bolster, less area for puncture.	Large extent of flank area available for puncture
Maneuverability of scope is difficult as it hits the bolster or the operating table.	More maneuverability of scope
Even after tilt, area of access is less	Tilt of ipsilateral side gives more area of access
Multiple punctures can be taken but area for punctures is limited	Multiple punctures can be taken as area for puncture is more
Upper pole more difficult to access.	Can access all the poles, even upper pole on deep inspiration
Retrograde access is slightly tight because of the bolster	Retrograde access is easy
	

DISCUSSION:

Urinary stone disease is a significant health problem, causes progressive renal function deterioration. Therefore, surgical total clearance is imperative and to achieve this, position of the patient plays a vital role. In our study Mean Operative Time for GMV > BFF as comparable to Melo PAS et al.⁴ (GMV > BFF.) Stone clearance rate for BFF (90%) > GMV (70%) which is similar to the study by Fernstrom et al.⁵ While operating, the table and patient's hip block the free movement of the rigid nephroscope manipulation in GMV > BFF. As the abdomen is free the kidney also becomes free and mobile and hence making the renal puncture more difficult. Posterior-medially lying upper pole stones are more difficult to target in GMV and provides less availability for multiple accesses due to the presence of the bolster. Panagiotis Mourmouris et al.⁶ states that all studies in the past shows that BFF is a safe and efficient alternative to GMV position, but its advantage depend on the factors relating to the patient and the stone⁶. BFF has its advantages over GMV in our study, though our study has a few demerits, it helps us to understand the superiority of the position over the other. That being said, GMV position has its benefits as well. Hence, we would like to recommend that the choice of position for the surgery should always be decided by the surgeon and the operating team's experience, the patient's preference, BMI, co-morbidities and stone load.

CONCLUSION:

Ideal position for PCNL will always remain a point of controversy. Beyond this debate of prone versus supine positions, now variations of supine decubitus make this debate even more complex. Supine position is urologist friendly position because of better ergonomics, lesser radiation exposure and gravity dependent drainage. Anesthetist are happy because of the ease of conversion to GA, better access in patients who are morbidly obese, have skeletal deformities, COPD or cardio-respiratory problems. It is more time saving as there is no change in position, faster fragment drainage and retrograde access is easily possible anytime. But it has its demerits also such as longer track length, greater kidney mobility and less maneuverability of instruments as compared to prone position. But between the two supine positions our study has proved that if we have to pick a single position depending on the patient and stone location then, BFF is preferable in many aspects as discussed earlier to GMV and hence can be the preferred choice of position while performing PCNL. But we

must not forget that in the difficult cases or where complete cleanse couldn't be achieved prone position will always help us.

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