

Evaluation of Supracostal Punctures in PCNL

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Abstract

Aim: Aim Of Our Study On Effective Stone Clearance Rate, To Analyze And Study The Intra And Post-Operative Complications And To Study The Morbidity In Terms Of Hospital Stay. **Materials And Methods:** It Is A Prospective Study Conducted In The Department Of Urology In Patients With Large Renal Calculi, Upper 1/3rd Ureteric, PUJ Calculus And Calyceal Calculi. Total 100 Patients Were Selected For The Study. 52 cases Of Supracostal PCNL And 48 Cases Of Subcostal PCNL. **Results:** Duration Of Surgery Is Significantly <0.05 In Supracostal Group In Comparison With Subcostal Group Were As And Hospital Stay Are Less In Supracostal Group But Not Significantly. 96.1% Stone Clearance Is There In Supracostal Group And 93.75% Subcostal Group. All Cases Of Supracostal Group Have Single Puncture And 2.3% Required Supra 11th Rib Punctures. 97.7% Of Cases Required Supra 12th Rib Punctures. Post Operative Fever Was Observed In Both Groups. Post-Operative X-Ray KUB On Day Two Showed Insignificant Calculi In 5% And Significant Calculi In 2.5% Of Subcostal Group. Post-Operative X-Ray KUB On Day Two Showed Insignificant Calculi In 4.76% Of Supracostal Group. **Conclusions:** Supracostal PCNL Is A Safe Procedure With Acceptable Morbidity.

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I. Introduction

Percutaneous Nephrostomy Is The Cornerstone Of Every Percutaneous procedure In The upper Urinary Tract. As A Minimally Invasive Conduit To The Pelvicalyceal System, The Percutaneous approach Provides A Convenient Route For The Diagnosis Of Upper Urinary Tract Pathology. In The age Of Minimally Invasive Surgery, Urologists Who Are Able To Master The Technique Of Percutaneous renal Access Have distinct Advantage In Remaining At The Forefront Of The Rapidly Evolving Field Of Endourology.¹

Advances In Surgical Technique and Technology have Allowed the Urologist To Remove Calculi Percutaneous Approach To Stone removal Is Superior To Larger Or Complex Calculi At Most Institution. An Intimate Understanding Of The Anatomic Relationships Of The Kidney And Surrounding Structures Is Crucial For Successful And Safe Percutaneous Entry Into The Renal Collecting System In 2005², The Clinical Practice Guidelines Report For The Management Of Staghorn Calculi And By The AUA Guidelines Panel Confirmed That Percutaneous Nephrolithotomy Should Be The First Line Of Management For Most Of The Patients With Staghorn Calculi. Aim Of Our Study On Effective Stone Clearance Rate, To Analyze And Study The Intra And Post-Operative complications And To Study The Morbidity In Terms Of Hospital Stay.

II. Materials And Methods

It Is A Prospective Study Conducted In The Department Of Urology From March 2008 To June 2010. Total 100 Patients Were Selected For The Study. 52 cases Of Supracostal PCNL And 48 Cases Of Subcostal PCNL. The Patient With History Of Lion Pain, Hematuria, With Or Without Fever, Nausea And Vomiting, Suspected To Have Urolithiasis Were Evaluated Thoroughly. Thorough General Physical Examination Of The Patient, Spine And Genitourinary Examination Was Done. Routine Protocol Investigations Done As Per The Preoperative Study Guidelines.

Inclusion Criteria: Patients With Large Renal Calculi, Upper 1/3rd Ureteric, PUJ Calculus And Calyceal Calculi.

Exclusion Criteria: Patients With Active Urinary Tract Infection, Bleeding Active Pleural Pathology, Significant Hepatomegaly And Splenomegaly.

Initially With Ultrasound KUB And Then IVU/CT -KUB To Know The Exact Location Of Calculi, Pelvicalyceal Anatomy And Dilation Lie Of The Kidney, Relationship With Renal And Surrounding Organs. Informed Written Consent Was Taken In All Patients. Antibiotics Were Given At The Time Of Induction Of Anesthesia. Type Of Puncture Either Supracostal Or Subcostal Was Analyzed Preoperatively And Also Intraoperatively After RGP On Prone Position Under C-Arm. All Cases Were Done Under General Anesthesia.

Complete Blood Count And Urinary Examination, S. Creatinine, Random Blood Sugar Viral Markers Urine For Culture And Sensitivity, Blood Grouping And RH Typing Was Done In All Patients. If Creatinine More Than 1.5 Mg/Dl Plain CT KUB Was Advised And If Below 1.5 Mg/Dl Then IVU Was Done In All Patients. In Case Urine Culture Was Positive For Micro-Organism Growth Appropriate Culture Sensitive Antibiotics Were Initiated Prior To Intervention.

At First Under Lithotomy Position With Adequate Paddings To Pressure Points, Cystoscopy And Retrograde Ureteric Catheterization With No 5/6 Fr Ureteric Catheter Over A 035/0.32 Guide Wire Was Done In All Cases Under Fluoroscopy. Then The Patients Were Turned To Prone Position With Adequate Paddings, Retrograde Pyelography Was Done With Urograffin 1.2 Dilution With Normal Saline (10 ml Of Urograffin With 20ml Normal Saline). The Grade Of Hydro Nephrosis, Infundibulo-Pelvic Angel In Relation To The Stone Burden Was Noted. Appropriate Calyx Was Chosen For Puncturing I.E, Infundibulopelvic Angle Of More Than 45 Degrees For Entering The Pelvicalyceal System Under Fluoroscopy. Skin Entry Point Was Internal To The Lateral Border Of Erector Spinae Muscle, At The Level Of Posterior Axillary Line, Puncture Is Done During Expiration. Needle Position Was Assessed Both In Zero And 30 Degree Angles Under Fluoroscopy. After Confirmation Of Needle Position Within The PCS And Stellate Was Removed To Look For Urine Gush. After Which Tract Wasserially Dilated With Alkens Metallic Dilators Over The Guide Wire And Guide Rod And Implants Sheath Was Placed Into The Pelvicalyceal System With Guide Wire In-Situ Till The End Of The Procedure.No 27 Fr Rigid Nephroscope Was Used For The PNL. Procedure. Normal Saline Was Used For Irrigation. For Intracorporeal Lithotripsy Pneumatic Lithotripter Or Ultrasonic Lithotripter Was Used Depending On Stone Burden. Stone Fragments Were Retrieved With Stone Holding Forceps Or Basketing. Entire Pelvical System Was Visualized At The End Of The Procedure And Confirmed With Fluoroscopy For Complete Stone Clearance. Fluoroscopy Was Helpful Even To Assess Significant Pleural Breach And Pulmonary Complications In Immediate Intraoperative Period.

Antegrede DJ Stent No 5/6 Was Placed In All Cases. Red Rubber Drain No 24/26 Fr Was Used As Percutaneous Nephrostomy In All Cases And Was Secured To The Skin. Ureteric Catheter Was Removed At The End Of The Procedure. Postoperatively Patients Were Shifted To Wards And Oral Fluids Followed By Soft Diet Was Initiated In All Cases After 6 Hours. Post-Operatively Quinolones Culture Positive Antibiotics Were Continued For 5-10 Days. Tramadol Hydrochloride 50mg Was Used For Analgesia Twice Daily. Patients Had Mild To Moderate Pain At The Operated Site 1-2 Days Which Was Treated By Tramadol Hydrochloride. Severity Of Pain Was Reduced By Fifty Percent By Second Postoperative Day. We Were Able To Remove PCN Tube On The First Postoperative Day On All Patients As Urine Was Clear Or Mildly Hemorrhagic. In Case Grosshematuria On Day One, PCN Was Clamped Overnight And Was Removed On Day One Morning Once The Urine Is Clear. X-Ray KUB Was Taken To Assess The Clearance Of Stone And Ultrasound Was Done In Cases Of Radiolucent And Ultrasound Chest Done If There Is Any Significant Evidence Of Pleural Breach Clinically Or On X-Ray.

In Case Of Significant Residual Residual Stone I.E, Stone Size More Than 4mm And Symptomatic In The Form Of Pain, Infection, Obstruction, ESWL Used As An Auxiliary Procedure. For Insignificant Residual Stone, I.E. Stone Size Of Less Than 4mm And Asymptomatic Without Pain, Infection/Obstruction Were Offered Nothing And Discharged With To Review After 3 Months With Repeat Ultrasound KUB. For Patients With Postoperative Urosepsis Repeat Urine For Culture Was Sent And Were Treated Accordingly.

All Continuous Variables Were Expresses As Mean ± Standard Deviation. Continuous Variables Were Compared And Analyzed Using Chi-Square Or Fischer’s Test As Test. Categorical Variables Were Compared Using Chi-Square Or Fischer’s Test As Necessary. Statistical Was Performed Using Medical Version 11.3.

III. Results

Total 100 Patients Were Selected For The Study. 52cases Of Supracostal PCNL And 48 Cases Of Subcostal PCNL.

Table-1: Demographic Distribution

Age Intervals In Years	Subcostal Number(%)	Supercostal Number(%)
11-20	8(16.6%)	2(3.84%)
21-30	5(10.4%)	6(11.5%)
31-40	8(16.6%)	10(19.2%)
41-50	15(31.2%)	20(38.4%)
51-60	7(14.5%)	9(17.3%)
61-70	4(8.3%)	3(5.7%)
71-80	1(2.08%)	2(3.8%)
Total	1(2.08%)	2(3.8%)
Average	39.6 ± 15.3	43.1 ± 9.7
Gender		
Males	35(72.9%)	34(65.38%)

Females	13(27.1%)	18(34.6%)
Side Of The PCNL		
Right Panel	28(58.33)	35(67%)
Left Panel	20(41.6%)	17(32.69%)
Stone Distribution		
Large Renal Calculi	34(70.8%)	25(48%)
Partial Staghorn Calculi	4(8.3%)	6(11.5%)
Upper 1/3 Rd. Ureteric Calculi	10(20.3%)	7(13.4%)
Puj Cal	0%	9(17.3%)
Compl Stag	0%	4(7.6%)
Renal Pelvic Calculi	0%	1(1.9%)
Size Of The Stone		
2cm	17(35.4%)	21(40.38%)
2-3cm	15(31.2%)	17(32.69%)
3-4cm	13(27%)	8(15.38)%
4-5cm	3(6.25%)	6(11.53)%

Demographic Details Are Insignificant In Comparision With Both Groups .

Table-2: Duration Of Surgery And Hospital Stay In Groups

Duration Of Surgery	Subcostal Number(%)	Supracostal Number(%)
60 Minutes	29(60.4%)	37(71.1%)
90 Minutes	14(29.1%)	11(21.1%)
100 Minutes	4(8.33%)	47.69%
120 Minutes	1(2.30%)	0%
Average	73.2 □ 18.1mins	70.28 □ 16 Mins
Hospital Stay		
3 Days	33(68.75%)	32(61.5%)
4 Days	7(14.58%)	5(9.6%)
5 Days	6(12.5%)	7(13.46%)
6 Days	2(4.1%)	8(15.3%)
Average	3.5 □ 0.9days	3.4 □ 0.1days

Duration Of Surgery Is Significantly <0.05 In Supracostal Group In Comparision With Subcostal Group Were As And Hospital Stay Are Less In Supracostal Group But Not Significantly.

Table-3: Stone Clearance In Study.

Stone Clearance	Subcostal Number(%)	Supracostal Number(%)
Complete Stone Clearance	45(93.75%)	50(96.1%)
Insignificant Residual Calculi	2(4.1%)	2(3.8%)
Significant Residual Calculi	1(2.08%)	0%

96.1 % Stone Clearance Is There In Supracostal Group And 93.75% Subcostal Group.

Table-4: Side Effects Associated In Surgery

Punctures	Subcostal Number(%)	Supracostal Number(%)
Double Punctures	2(4.1%)	0
Single Punctures	46(95.8%)	52(100%)
Post-Operative Fever	16(33.33%)	14(26.2%)

All Cases Of Supracostal Group Have Single Puncture And 2.3 % Required Supra 11th Rib Punctures. 97.7% Of Cases Required Supra 12th Rib Punctures. Post Operative Fever Was Observed In Both Groups. Organ Injury, Pulmonary Complications Like Pneumothorax, Hydrothorax, Hemothorax And Perinephric Collections Was Not Seen In Any Of The Cases.

IV. Discussion:

We Have Considered 52cases Of Supracostal PCNL And 48 Cases Of Subcostal PCNL For My Prospective Study To Know The Safety And Efficacy Of Supracostal PCNL In Terms Of Hospital Stay, Intrathoracic Complications, Organ Injury, Need For Blood Transfusion, Stone Clearance Rate And Need For Auxilliary Procedures. In Subcostal Group Majority Of Patients Were Male 70%,And Right Sided PCNL (55%) Predominated Where As In Supracostal Group Male Were 57.14% And Side Of PCNL Right 64.28% And Left Was 35.71%.

TABLE 5: Comparison Of Complications Of Supra Costal PCNL

Study	No.	Supra-12 th supra-11 th (%)	Overall number of complications (%)	Sepsis/ Bacteremia (%)	Thoracic (%) Pneumothorax x Hydrothorax Hemothorax Renopulmonary fistula (%) Needed treatment.	Other organ injury (%)	Significant blood loss /required blood transfusion (%)
Present study	100	50 2	14(16.2%)	0	0	0	3(5.7%)
G.Ravichandrar ¹	42	41 1	8(19.0)	5(11.9)	3(7.1) 0(0) 3(7.1) 0(0) 0(0) 2(4.76)	0(0)	3(7.1)
Kekre et al ² 2001	102	102(100)	10(9.8)	0(0)	10(9.8) 1(1) 9(8.8) 0(0) 9(8.8)	0(0)	0(0)
Gupta et al ³ 2002	62	62(98.4) 1(1.6)	14(22.2)	7(11)	7(11) 0(0) 7(11) 0(0) 4(6.3)	0(0)	6(9.5)
Loganapwat et al ⁴ 2006	170	170(100)	31(18.2)	1(0.6)	26(15.3) 0(0) 26(15.3) 0(0) 9(5)	0(0)	4(2.4)
shah et al ⁵ 2006	144	110(76) 35(24)	19(13.2)	6(4.1)	5(3.5) 0(0) 5(3.5) 0(0) 1(0.7)	0(0)	7(4.9)
sukumar et al ⁶ 2008	110	110(100)	13(11.8)	2(1.8)	10(9.1) 0(0) 10(9.1) 10(9.1)	0(0)	2(1.8)
shaban et al ⁷ 2008	30	24(80) 6(20)	4(13.3)	1(3.3)	2(6.6) 0(0) 1(3.3) 1(3.3) 2(6.6)	0(0)	1(3.3)

Subcostal PCNL Was Chosen In Patients With Large Or Upper Or Partial Staghorn Stone Where The Stone Burden Is Lower Polar And To Enter Desired Calyx In A Straight Line And To Avoid Undue Scope Angulation, So That Scope Manipulation Is Easier And Stone Clearance Rate Is Maximum. In Majority Of Patients subcostal PCNL Was Indicated For Large Renal Calculi (72%) With Lower Pole Stone Burden, Upper 1/3rd Ureteric Calculus (20%) And Partial Staghorn Calculi (7.5%).

Supracostal PCNL Was Done In Patients With Complete Or Partial Staghorn (22%), Upper 1/3 Rd Ureteric Stone (12%) PUJ Calculus (21.42%), And Renal Calculi With Upper Pole Stone Burden (42.85%), Renal Pelvic Calculi (2.3%), Taking Into Consideration The Infundibulopelvic Angle Of Greater Than 45 Degree For Appropriate Calyceal Puncture And Relation Of Rids To Stone Burden And Desired Calyx Which Is To Be Punctured.

Sudhir Sukumar Et Al³ Indications For Supracostal PCNL Access Included Large Pelvic Stones, Partial Or Complete Staghorn Calculi, Upper Ureteric Stones N.S. Kekre Et Al⁴ indication Of Supracostal PCNL: Large Solitary Renal Stone(66.5%), Multiple Stones (15.7%), Staghorn (19.6%) And Upper Ureteric Stones (32.4%) Constituted Commonest Indication. Stening Et Al.⁵ large And Upper Pole Calyceal stone , Particularly In Morbidly Obese Patients, Can Be Treated Effectively By Supracostal PCNL, With ESWL For Residual Fragments. There Were No Intrathoracic Complications With Minimal Blood Loss. Ahmed R. Et Al⁶ pcnl Is Safe And Effective In Children.

Double Puncture Was Needed In 2.5% Of The Subcostal Group To Achieve Complete Stone Clearance. In Supracostal Group None Of The Patients Required Double Punctures For Stone Clearance In Our Series. Tolga Akman Et Al⁷ observed Success Rate Of 70.1% In Single Tract And 81.1% In Multiple Track Supracostal PCNL. The Mean Changes In Creatinine Values In Both The Groups Are Same, And The Impact On Renal Function Is Of A Temporary Nature. Mahesh Desai Et Al⁸ multiple Track pcnl Remains The Main Stay Of Efficient And Safe Management Of Staghorn Calculi. Upper Pole Puncture Is Associated With Bleeding And Pleural Breach.

In Our Study Groups PCN Tubes Were Removed On Day One Post-Operatively In Most Of The Cases, Chest X-Rat Was Within Normal Limits In All Patients. Post-Operative Period Was Uneventful Except For Pain And Fever Which Was Managed Conservator. The Duration And Severity Of Pain And The Need For Analgesia Were Comparable In Both The Groups. There Was No Need For Extended Hospital Stay And Need For Respiratory Related Events In Supracostal Group.

Radecka Et Al⁹ In A Comparative Study Between Supra And Subcostal PCNL, Respiratory Related Pain Noted In 32% Vs 5%, In 5% Of Cases In Both Group Required Arterial Embolization For Uncontrolled Bleeding, And 5% Had Pleural Effusion And Pneumothorax In Both Groups.

In Our Study, Associated Co-Morbidities Like Diabetes Mellitus, Hypertension Was Seen In 40% (P Value=0.4 Not Significant). Of Subcostal Group And 47.59% Of Supracostal Group, There Was No Increased Morbidity. In Subcostal Group Either Mid Calyx (40%) Or Lower (60%) Were Punctured, Whereas In Supracostal Group (40%) Or Upper Calyx (60%) Were Punctured. Supra 11th Rib Puncture Was Done In 2.3% Of The Cases In Supracostal Group, Who Large Renal Calculi With Upper Pole Stone Burden. Her Hospital

Stays Extended O 4 Days Due To Fever And Was Discharged With Uneventful Recovery Without Any Respiratory Related Events And Complete Stone Clearance, Post-Operative X-Chest, Ultrasound Chest And X-Ray KUB Were Normal.

Andreas J. Grosset Al¹⁰ Reported, Modern Flexible Nephroscope With Holmium Laser And Nittinol Baskets Have Reduced The Number Of Percutaneous Tracts For Stone Clearance.

P.N Maheshwari Et Al¹¹ 81% Were Treated By An Approach Above 12th Rib, And 19% Above 11th Rib. 68% Had Single Supracostal Tract And 32% Had Double Tract. Supracostal Punctures Were Done Just Lateral To Mid Scapular Line, Tract Dilatation Done Upto 28-30 Fr. In Both Groups, Patients Had Mild To Moderate Pain At The PCN Site For 1-2 Days Which Was Managed Adequately By Analgesics, We Used Tramadol Hypochloride 50 Mg Twice Daily In All Patients For 2 Days Post-Operatively And As When Required There After . There Were No Statistically Significant Group In Any Age Groups.

Karim Kader Et Al¹² Placement F 8.5/6 Neproureterostomy Catheter At The End Of The Procedure, Diminishes Postoperative Pain And Decreases Hospital Stay Of I Vs 4 Days In Comparison To 24fr Malecots Catheter. Expected Hospital Stay Of 3 Days Was Seen In 70% In Subcostal Group And 69.04% In Supracostal Group, Which Is Not Statistically Significant. Extended Hospital Stay Of 4 To 6 Days Was Seen In 30% Of Cases In Subcostal And 35% Of Patients In Supracostal Group. The Cause Of The Extended Stay In All The Patients Was Post-Operative Fever. Culture Sensitive Higher Antibiotics Was Initiated In All The Patients Postoperatively And Were Thus Managed Conservatively.

Ahmed R.Et Al⁶ Complication Rates Were Comparable In Both Group Comparable In Both Groups, Blood Transfusion -5% Fever -5%, Urinary Leakage Through PCN Site-5%, With 77% Stone Free Rate And 15% Needing ESWL As Auxiliary Procedure And 8% Had Insignificant Calculi. Sudhir Sukumar Et Al³ Stone Clearance Of 86.4% With Auxiliary Procedures It Increased To 97.3% Post-Operative Stay Ranged From 2-15 Days Because Of Sepsis. Post-Operative X-Ray Chest Was Normal In Both The Group In All Patients In Our Study.

Kennath Organ Et Al¹³ Intraoperative Chest Fluoroscopy During PCNL Is Sufficient To Detect Clinically Significant Hydro Pneumothorax, Routine Postoperative Chest X-Ray Is Not Necessary. However, A High Index Of Suspicion Based On Clinical Symptoms Prompt Chest X-Ray Postoperatively. Post-Operative X-Ray KUB Was Done On Day 2 Showed Insignificant Calculi In 5% And Significant Calculi In 2.5% Of Subcostal Group And Insignificant Calculi Was Seen In 4% Of Superacostal Study Patients. No Patients Had Significant Residual Calculi In Supracostal Group. Patients With Significant Calculi In Subcostal Group Underwent ESWL As An Auxiliary Procedure, Subsequently They Were Rendered Stone Free After Single Sitting Of Extracorporeal Shockwave Lithotripsy. Auxiliary procedures Group 0%. Patients With Insignificant Calculi Were Not Subjected To Any Auxillary Procedursss In Our Study.

In Subcostal Group, Sugary Was Completed In 60 Minutes In 65%, And Surgery Was Extended Up To 90 Mints Or More When The Stone Burdened Than 3cm. In 71.4% Of The Patients, Supracostal PCNL Procedure Was Completed In 60 Minutes It Took 90 Minutes Or more In 28.56% Of Cases, As The Stone Burden Increased (>3cm).

B.Lojoa Piwat Et Al¹⁴ In S Comparative Study Of Subcostal And Supra Costal PCNL I.E Group-1 And Group-2, Group-1 Had Stone Clearance Rate Of 82.2% Vs 77.7% Residual Stone Of 10.7% Vs 14.7% Hydrothorax Of 15.3% Vs 1.4%, And 5.3% Required Intercostal Drainage Tube. The Rate Of Pulmonary Complications Is Higher With Supracostal, Hence Done With Caution.

Abdul Kadir Et Al¹⁵ The Mean Operative Time Was 78 Minutes In Both Group, The Fluoroscopy Screening Time 3-50mins. The Fluoroscopy Time Was Prolonged In Patients With Increased Stone Burden And Multiple Tracts. Blood Transfusions Were Not Required In Either Of The Study Group

Patterson DE, Segura Jwet Al¹⁶, Reported Overall Blood Transfusion Rate After PCNL Ranges Between 6-23%. Organ Injury, Pulmonary Complications Like hemothorax, Pneumothorax, Hydro Pneumothorax Requiring Intercostal Drainage And Perinephric Collections Were Not Noted In Either Of The Study Group.

P.N. Maheshwari Et Al¹¹ There Were No Serious Pulmonary Complications Noted After A Supracostal Puncture Made Just Below The 10th Rib. 2% Had Pleural Effusion Managed With Intercostal Drainage Tube Placement.

N.S.Kekre Et Al⁴ Complete Clearance Was Achieved In 79.5% Of Supracostal Group And 9.8% Had Pleural Violations And Managed With Intercostal Tube Placement

Kenneth Et Al¹³ Described A Simplified Approach To Intraoperative Thoracotomy tube Placement Using Fluoroscopy Without Increasing Patient Morbidity And Length Of The Hospital Stay.

Raymond KO Et Al¹⁷ bleeding Necessitating Blood Transfusion Seen In Less Than 1% On Supracostal pcnl Cases. Bleeding Most Often Is Venous And Can Be Managed By PCN Tube Placement Or Clipping Pcnl Or If It Still Persists Selective Angioembolization Of Artery, Liver Injury Rarely Requires Further Treatment, While Splenic Injury Might Need Immediate Surgery.

Serpil Et Al: With Supra Costal PCNL Observed Intrathoracic Complications Of 23% And Unrecognized Massive Hydrothorax Due To Prone Position, Which Was Dealt With Intraoperative Period.Total Tubeless Required Less Analgesia, And Discharged 20 Hours Earlier. It Can Have Considered Standard Care In Selected Patients

V. Conclusion

Supracostal PCNL Is A Safe Procedure With Acceptable Morbidity. When The Puncture Site Is Well Planned, That Is Keeping It On Or Lateral To Posterior Axillary Line And Puncturing During Expiration, Will Avoid Thoracic Complications. It Has High Rate Of Stone Clearance I.E, More Than 90% Especially When The Stone Burden Is In The Upper Pole And Complex Stone Including Complete Staghorn Calculi. Operation Duration Are S Same As In The Subcostal PCNL. Hospital Stay In Comparison With Subcostal PCNL Was Same. The Need For An Axillary Procedure For Complete Stone Clearance Is Less. The Incidences Of Solid Or Hollow Organ Injury Can Be Avoided If Preoperative Evaluation Before Supracostal PCNL Procedure Is Done Adequately. It Can Be Done Safely In Pediatric As Well As Elderly Population Safely hemorrhagic Complications Can Be Avoided By Appropriate Preoperative Evolution In Terms Of Bleeding Diathesis Wherever Suspected And By Strict Adherence To The Principles Of Appropriate Calyceal Punctures And Tract Dilatation.

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