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Tailoring Surgical Intervention By Comparing Outcomes Of Definitive One Stage Vs Staged Repair For Female Anorectal Malformations With Recto Vestibular Fistula

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ABSTRACT

Background : The corrective management of Anorectal malformations with recto vestibular in female babies by single stage surgery with good surgical yield is a challenge. Here we assess the immediate and mid-term outcomes of definitive repair by single stage vs staged repair in cases of Anorectal malformation with recto -vestibular fistula.

Material and Methods : Consecutively patients operated for ARM with Recto vestibular fistula in KLE's Dr Prabhakar Kore Hospital ,Belagavi were taken in the study.22 patients who met inclusion criteria were included in the study and were divided into 2 Groups by randomization .A prospective comparative study was conducted between Jan 2017 to Dec 2024 with minimum follow up of 5 monthss.

RESULTS:[22] Patients were included (Group A:Single stage /primary repair group[11], Group B:Staged surgery group[11]) . Both the groups had a comparable results however the rates of infection and continence issues were slightly more in primary repair patients. Patient compliance and quality of life scoring was better in primary repair patients (Group A).

Conclusion-The outcomes of primary repair and multi staged repair for ARM with recto-vestibular fistula were comparable however the long term issues and complications were acceptable in both groups. A systemic review and meta-analysis is required to assess the outcomes in large sample size of patients operated by primary repair (ASARP) procedures.[7]

1. INTRODUCTION

Anorectal Malformation (ARM) is a congenital malformation with incidence of 1 in 5000 live births requiring surgical repair[1]. Female babies with recto-vestibular fistulas can be managed either by primary repair by Anterior Sagittal Ano-rectoplasty (ASARP) /PSARP Or by conventional multi stage approach with colostomy at birth followed by ASARP and colostomy closure[2] . Controversy exists regarding the optimal surgical approach [3] for female ARM, with some advocating for single-stage repair and others recommending staged surgery. ASARP in single stage and 3 stages for rectovestibular fistula gives similar results as per literatures and hence preferring single stage procedure is considered advantageous.

Single stage repair can eliminate social and parental inconveniences[5] like repeated hospital admissions,surgeries ,follow up visits,stoma care ,and save the cost and expenditures for the treatment. Taking all this into consideration along with the surgeons decision making to choose the approach for the management we decided to study the outcomes of single stage repairs by comparing them with the outcomes of staged repair surgeries .

The optimal surgical repair should allow easy access to the fistula, minimize the dissection to spare pelvic nerves, guide the rectal pouch through all the muscles of continence, restore a physiological anorectal angle, create good anal opening and take advantage of all existing structures which is possible with ASARP[1,2].

Aim/Objective: To study the immediate and mid-term outcomes of primary repair by Anterior sagittal Anorectoplasty (ASARP) with those of staged surgical repair for ARM with Recto-vestibular fistula.

Materials and Methods: Cases of female ARM with recto-vestibular fistula undergoing surgical repair between Jan 2017 to Dec 2024 in KLE's Dr Prabhakar Kore Hospital Belagavi were taken .Patients born at /after 34 weeks of gestation were included in this study.Patients were divided into two groups :Primary repair (Group A) and staged repair (Group B) with atleast following upto 6 months.

Informed written consent was taken from the parents for including the patients in the study along with permission for including photographs and pictures taken intrao-operatively and on post-operative follow up.

Group A underwent surgery within 3 months of life while Group B underwent surgeries in multiple stages, at birth, at 3_ 4 months of life and 3rd stage surgery within 6 months of life .Demographics , length of stay, complications and long term outcomes continence ,constipation and quality of life were compared -

2. TOOLS OF ASSESSMENT

COMPLICATIONS

(Minor): Infection, partial dehiscence, retraction,prolapse (Major): Complete dehiscence, severe retraction,stenosis CONTINENCE : Kelly's scoring, krickenbeck continence scoring used, need of diet modification CONSTIPATION: History, examination & Scoring used, need of medication, life style

QUALITY OF LIFE SCORING(QOL): 14 point on Likert score with respect to soiling, attendance at school, playing abilities, life stlye changes and social factors were noted by the patient(>8years) and parent questionnaire.

Primary repair/Single -stage ASARP-Pre-opertively baby was kept Nil per oral for >24hrs and started with iv fluids along with antibiotic coverage and per rectal fistula washouts.

Surgical procedure: Patient is placed in Lithotomy position with the bolster elevating the back . New anus is identified by the presence of anal dimple or by the muscle stimulator. Vestibular opening is then caliberated . Racquet shaped incision was taken from fistula to centre of the muscle complex .Anterior fibres are only cut and posterior limit is untouched. Circumferential 5 '0 silk sutures were taken.Rectal wall is separated by posterior vaginal wall by alternating sharp and blunt dissection starting from posterolateral points and ending by anterior points at which common wall is separated carefully .Mobilisation of rectal pouch is continued till it reaches new anal site and placed at centre of muscle complex and anchored with 4 '0 absorbable suture . Repair of perineal body is done and neorectum is sutured to perineum.

Statistical Analysis : All data entered into Microsoft Excel 2019 and analysed using IBM SPSS (VERSION 25).Compared by Chi –square test for categorical variable and Fischer exact test to maintain statistical validity.A p-value of < 0.05 is considered to be statistically significant.

3. RESULTS:

[22] patients were included (Group A: [11], Group B: [11]). Both the groups had a comparable results however the rates of infection and continence issues were slightly more in primary repair patients and were statistically significant with p –value of <0.05. Patient compliance and quality of life scoring was better in primary repair patients (Group A).

PARAMETERS	SINGLE STAGE REPAIR	STAGED REPAIR	INTERPRETATION
AGE AT SURGERY	AT 3 MONTHS	AT BIRTH ,3-4 MONTHS ,6 MONTHS	SINGLE STAGE PROCEDURE IS DONE EARLY
ASSOCIATED ANOMALIES	18%	18%	COMPARABLE ANOMALY TRATE
PREOP PARATION	48HRS FISTULA WASH OUTS	NONE	MORE PRE OP PREPARATION NEEDED
INTRAOPERATIVE TIME	100 MINS	90 MINS(2^{nd} stage)	SLIGHTLY MORE IN SINGLE STAGE
BLEEDING(PCV TRANSFUSED REQUIRED IN)	27%	18%	MORE BLLEDDING IN SINGLE STAGE
VAGINAL INJURY	9%	18%	MORE INJURY IN STAGED PROCEDURES (DUE TO REPEATED SURGERIES)
IMMEDIATE POST OP COMPLICATIONS	27%	18%	LOWER IMMEDIATE COMPLICATIONS IN 3 STAGE
LATE COMPLICATIONS	27%	27%	IDENTICAL

HOSPITAL STAY	LONG	MEDIUM ,BUT REPEATED ADMISSIONS	OVERALL, STAGED PROCEDURE HAS LONG STAY DUE TO REPEATED SURGERIES
REDO SUGERIES (MINOR)	9%	18%	HIGHER MINOR REDO SURGERIES IN STAGED
REDO SURGERIES(MAJOR)	9%	9%	SAME IN BOTH
KELLY'S SCORE (CONTINENCE)	GOOD	GOOD	COMPARED FUNCTIONAL OUTCOME
SOILING	18%	9%	MORE IS MORE IN SNGLE STAGE
QUALITY OF LIFE	GOOD	AVERAGE	SLIGHTLY BETTER IN SINGLE STAGE,AS BABY STARTS PASSING STOOLS EARLY

4. DISCUSSION –

Several surgical techniques have been proposed for the management of female anorectal malformations

Single stage has less morbidity at low cost. Better continence may be attributed to the better development of cerebral cortical fibres and sensation of fullness to develop fully. To achieve maximum potential it is indicated to operate the baby within one year of life[1].

The optimal surgical repair should allow easy access to the fistula, minimize the dissection to spare pelvic nerves, guide the rectal pouch through all the muscles of continence, restore a physiological anorectal angle, create good anal opening and take advantage of all existing structures which is possible with ASARP

This study compares the outcomes of primary repair (Group A) and staged repair (Group B) in female patients with anorectal malformations (ARMs), focusing on postoperative complications, functional outcomes, and quality of life. Both groups had 11 patients each. The analysis revealed no statistically significant difference across all evaluated parameters, though some clinical trends were noted.

Early and Late Complications

Early postoperative complications were slightly more frequent in Group A (27%) than in Group B (18%), while late complications occurred equally (27%). These findings align with prior studies such as that by Levitt et al. (2005)[1], which demonstrated that early complications like infection or dehiscence may occur slightly more in primary repairs, especially in cases without colostomy protection, though long-term outcomes remain similar. However, our results did not show a significant difference ($p = 1.000$).

Minor and Major Complications

Minor complications (bleeding, wound dehiscence) were more common in Group A (27%) than in Group B (18%), whereas major complications such as vaginal injury were more frequent in Group B (18% vs. 9%). Vaginal injury remains a feared complication in female ARMs, especially with cloacal anomalies or poorly defined anatomy. None of our patients who acquired vaginal injury had cloacal anomalies. Wong et al. (2013)[5] reported higher rates of vaginal or urethral injury in staged approaches when the initial colostomy was misaligned or inadequately mapped. Still, in our data, these did not reach statistical significance.

Functional Outcomes: Constipation and Incontinence

In this study, about 27% of the patients suffered from constipation after 3 postoperative months and this percentage decreased to about 7% after one postoperative year .In the series by, Wang et al. reported that 15.4% of the studied patients suffered from constipation after ASARP. However, Pena and Levitt observed a constipation rate of 55% after PSARP[2]. Constipation rate is almost equal in both

groups and is modified by diet ,enemas and laxatives

Constipation was slightly more prevalent in Group B (27%) compared to Group A (18%), while incontinence was more than double in Group B (27% vs. 9%), although this did not achieve statistical significance (p = 0.586).

In our study incontinence in group A- is 9% (1 out of 11) and GROUP A Continence scoring in our study is same as that reported by Waklu at el in their large series who reported that the post ASARP rate of good continence score was about 97.6% by using the Wingspread scoring system[3].

This study aligns with most literature, showing a non-significant trend toward more soiling in single-stage repair. Smaller sample size in our study may under power the ability to detect significance.The Krickenbeck classification helps standardize continence evaluation, and your results suggest comparable outcomes in both approaches.

These results suggest a potential functional advantage in primary repair, possibly due to better preservation of the sphincter complex when the anatomy is clearly visualized in a single-stage procedure. Similar findings were reported by de Blaauw et al. (2008)[3], emphasizing that continence is generally better in patients undergoing primary repairs when performed in specialized centers.

In primary ASARP approach colostomy is avoided, mobilization of the rectum is under vision, only the anterior aspect of the sphincteric muscle complex is divided, and the continence mechanism is well preserved. The operation also allows placement and anchoring of the mobilized rectum within the muscle complex; the sphincteric muscle and the perineal body are accurately approximated, and a normal perineum is reconstruction.

Redosurgeries and Quality of Life (QoL)

Group B had more redosurgeries (18%) compared to Group A (9%), suggesting higher complication-related burden in the staged group. Moreover, the subjective quality of life was rated “good” in Group A and only “average” in Group B, highlighting a clinically meaningful, though not statistically significant, advantage in the primary repair group. Previous studies, including those by Mollard et al. (2014) [4]and Sharma et al. (2017)[6], support the notion that fewer interventions, better functional outcomes, and preserved anatomy contribute to improved long-term QoL in single-stage repairs.

QUALITY OF LIFE SCORING(QOL): 14 point on Likert score with respect to soiling, attendance at school, playing abilities, life style changes and social factors were noted and were collected from parent questionnaires and by patient questionnaires if child is >8years of age.

Clinical Implications

Although statistical significance was not achieved (likely due to small sample size), the trend consistently favors primary repair in terms of continence, lower redo-surgery rate, and better QoL. This reinforces existing literature suggesting that, in carefully selected female ARM patients—especially those with recto-vestibular or perineal fistulas—single-stage repair is safe and effective[7].

5. LIMITATIONS

The study is limited by its small sample size and single centre study, which limits statistical power and generalizability. Larger multicenter prospective studies are needed to confirm these findings.

6. CONCLUSION-

Primary repair in female anorectal malformations show trend towards better functional outcomes ,fewer redo-surgeries and higher quality of life compared to staged repair,although these were not statistically significant. These results support use of single stage repair in appropriately selected patients and highlights the need for further research with larger cohorts and standardized outcome measures.

Declarations The authors have no financial or non-financial interests to disclose.

Ethics approval - The Institutional ethics committee (IEC) of JNMC, KAHER University have given the approval to conduct the study .

FUNDING- No funds, grants or other support was received.

Conflicts of interest-The authors declare no conflicts of interest.

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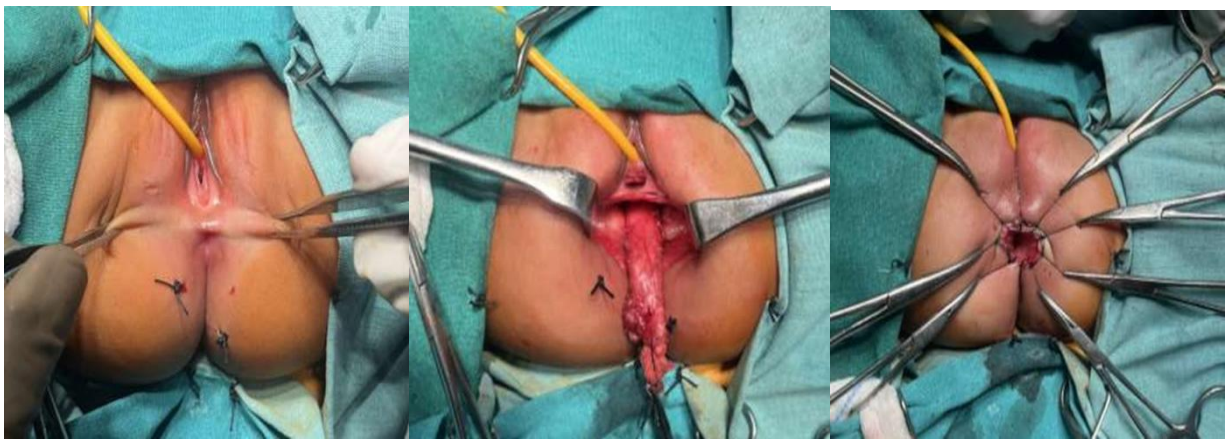
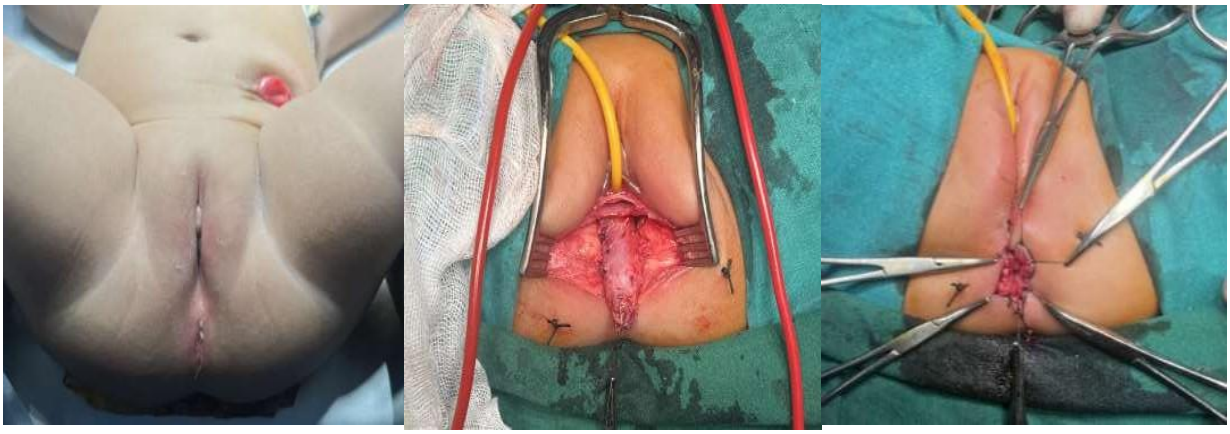
FIGURES AND TABLES

Figure- I - GROUP A - PRIMARY REPAIR / SINGLE STAGE REPAIR



PreOperative picture. Intra op. ASARP On completion of surgery

Figure - II - GROUP B - ASARP IN STAGED GROUP



PreOperative picture with colostomy Intra op ASARP as stage 2. On completion of surgery

Figure – III - OUTCOME OF SINGLE STAGE REPAIR ON FOLLOW UP

Follow up picture of single stage procedure

Follow up picture of staged procedure with abdominal scar of colostomy closure

Figure-IV

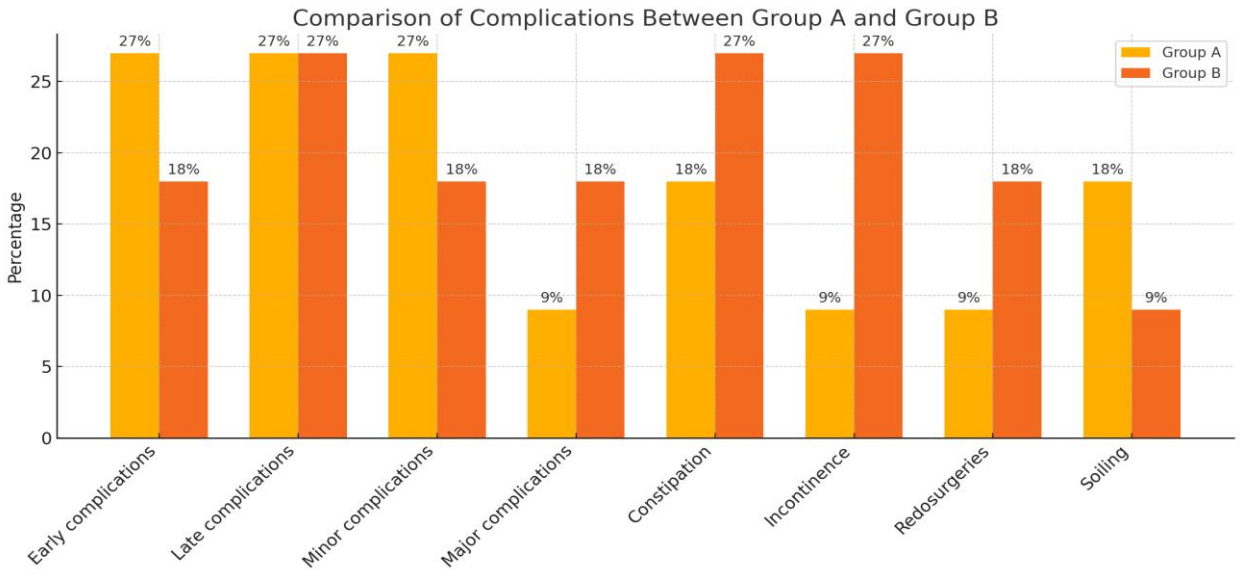


TABLE I P-Value

COMPLICATION	GROUP A (n=11)	GROUP B(n=11)	P values
Early complications	27%	18%	1
Late complications	27%	27%	1
Minor complications(BLEEDING,WOUND DEHISCENCE)	27%	18%	1
Major complications (VAGINAL INJURUY)	9%	18%	1
Constipation	18%	27%	1
Incontinence	9%	27%	0.4762
Redo-surgeries	9%	18%	1s
Soiling	18%	9%	1

TABLE II KRICKENBECK CONTINENCE SCORING

PARAMETERS	GROUP A	GROUP B

VOLUNTARY BOWEL MOVEMENT(VBM)	Present in 91%(10/11	Present in 73%(8/11)
SOILING GRADE	Mostly grade 1 (occasional)in 2 pts	Grade 1-2 in 1 pt
CONSTIPATION GRADE	Grade1-2 in 2 pts	Grade 1-2 in 3 pts

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