

Original Article

USE OF AUTOLOGOUS PLATELET RICH PLASMA PATCH IN THE REPAIR OF HYPOSPADIAS, OUR EXPERIENCE

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Objective: To assess the efficacy of autologous platelet rich plasma patch as a water proof sealant in the repair of hypospadias.

Methods: Study was carried out in the Department of Pediatric Surgery, SIMS/ Services Hospital, Lahore from July 2017 to July 2018. Hypospadias repair was done by using platelet rich plasma patch as a second layer over urethral repair. The platelet rich plasma patch was prepared from patient's own venous blood sample by centrifuging the sample at a fixed rate for fixed period of time. Statistical data was analysed by simple descriptive statistics.

Results: A total of 88 patients were operated for hypospadias repair during this period. The age of patients varies from 14 months to 13 years. Most of the patients fall between the age of 02 years to 08 years. Seventy patients were of distal shaft hypospadias, six were of mid shaft and twelve were of proximal shaft hypospadias. Ten out of 88 patients, developed urethrocutaneous fistula. Overall fistula rate was 11.36%.

Conclusions: Autologous platelet rich plasma is not only cost effective but also effective as a water tight second layer in reducing the incidence of urethrocutaneous fistula after hypospadias repair.

Keywords: autologous platelet rich plasma patch, urethrocutaneous fistula, tubularised incised plate urethroplasty.

Introduction

In hypospadias the opening of the urinary meatus is not present at the tip of the glans penis and instead it is present on the under surface of the penis. Hypospadias can be classified according to the location of abnormal meatus as distal penile 50%, mid penile 30% and proximal penile 20%.^{1&2}

Its incidence has increased over the years largely due to the use of female sex hormones for the induction of pregnancy and the use of androgens for male subfertility.³ Vegetarian diet is also considered to be a high-risk factor for hypospadias.³

Hypospadias surgery is very challenging as over 300 different surgical procedures have been described. Presently the common practical procedures are tubularised incised plate urethroplasty and bracka's repair which is the staged repair.

The common complication after hypospadias repair is urethrocutaneous fistula. Its incidence varies from 04 to 28%.⁴ Several covering techniques have been used to cover the newly formed urethral tube as a water proof layer to prevent the fistula formation, these include subcutaneous penile tissue, tunica vaginalis and dartos fascia.⁵⁻⁸ All are ways to reduce the fistula formation. Different commercially available sealants such as fibrin glue are used in the repair as a water tight seal layer. Instead autologous platelet rich plasma patch recently being used in the

repair of hypospadias with success in reducing the incidence of urethrocutaneous fistula.⁹

Methods

This study was carried out in the Department of Pediatric Surgery, SIMS Lahore from July 2017 to July 2018. During this period total 88 patients were operated for hypospadias using autologous platelet rich plasma patch as a water tight sealant layer covering the repair. The distribution of the type of hypospadias was as following, 70 patients were of distal penile, 06 were of mid shaft and 12 were of proximal hypospadias (**Fig-1**).

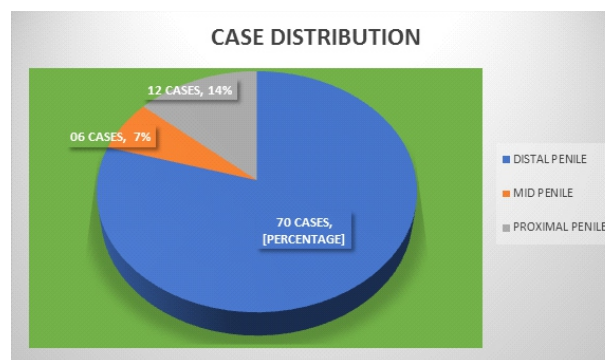


Fig-1: Case distribution.

For distal variety tubularised incised plate urethroplasty was performed while for mid shaft and proximal penile variety staged bracka's repair was carried out. In all the patients the stunt was removed on 08th post-operative day. All patients received antibiotic cover for gram-positive and gram-negative organisms and in proximal shaft hypospadias anaerobic cover was also added. Urethral dilatation was done on weekly basis for 03 weeks in operation theatre and subsequent follow up after 03 months. Age distribution was as follows.

Table-1: Age ranges between 14 months to 13 years.

Age range	Number of case
Less than 02 years	03
From 02 years to 05 years	34
From 06 years to 08 years	29
From 09 years to 12 years	21
Above 12 years	01

In our study 10 out of 88 patients developed urethrocutaneous fistula accounts for 11.36%. The distribution was as follows, **(Fig-2)** 08 patients were of distal penile hypospadias who developed fistula that is 9.09% of total cases and 11% of distal penile cases.

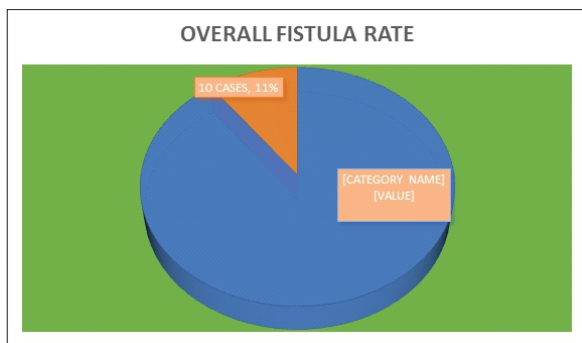


Fig-2: Overall fistula rate.

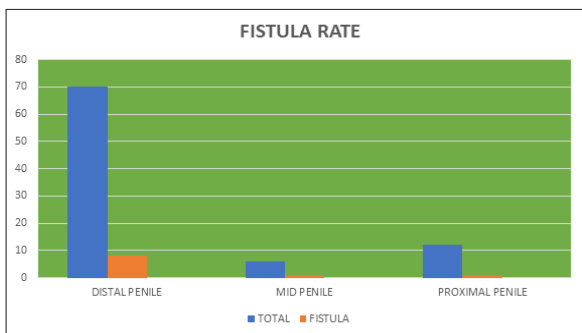


Fig-3: Fistula rate distribution.

01 patient of mid shaft hypospadias developed fistula accounts for 01.13% of total cases and 16.66% of mid penile cases. 01 patient of proximal shaft hypospadias developed fistula accounts for 01.13% of total cases and 08.33% of proximal penile cases. **(Fig- 3)**

Preparation of Autologous Platelet Rich Plasma Patch:

10ml of venous blood was withdrawn from the patient at the start of surgery and was placed in a sterilized test tube. The autologous platelet rich plasma patch was harvested by placing the test tube in centrifuge machine at 2000 revolutions per minute for 10 minutes. The result was formation of three layers. The upper layer containing acellular plasma, bottom layer containing red cells and the middle layer containing platelet rich plasma. **(Fig-1)** This middle layer was taken out and was applied as a second layer over the newly formed urethral tube. **(Fig-2)**

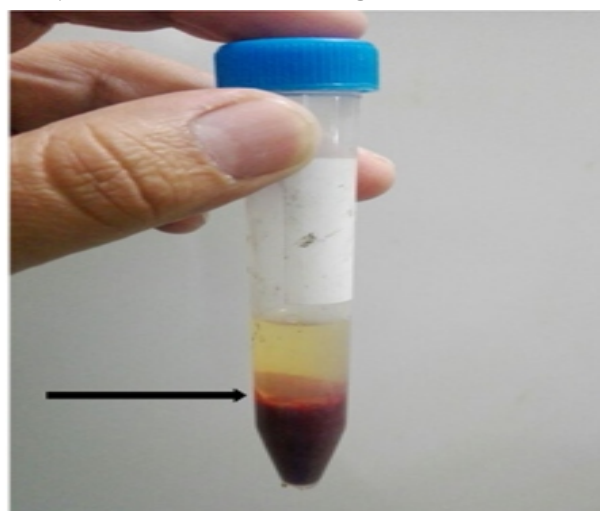


Fig-1: Arrow showing platelet rich plasma layer.

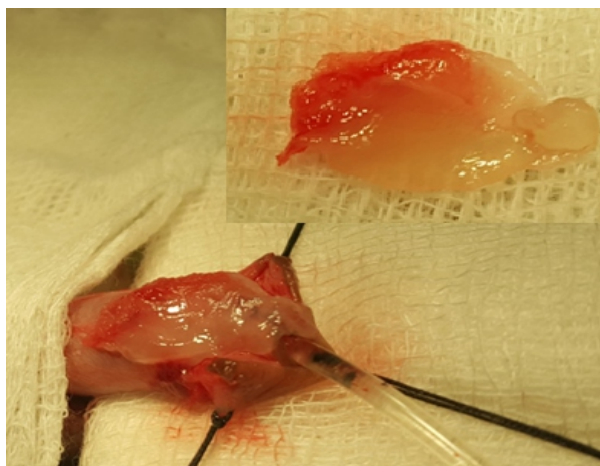


Fig-2: PRP Patch applied over newly formed urethra.

Discussion

The repair of hypospadias ever challenging surgery, over 300 surgical procedures have been described. Our practice is to do tubularised incised plate urethroplasty for distal penile hypospadias and staged procedure for mid penile and proximal penile hypospadias. Despite different surgical techniques, delicate tissue handling, fine suture material and use of magnifying loop, the urethrocutaneous fistula remains the most common complication all over the world. The incidence of urethrocutaneous fistula varies from 04 to 28%.⁴ Several local tissue flaps which include dartos fascia and tunica vaginalis have been used to interpose as a water proof layer between the urethral repair and the skin closure.⁵⁻⁸ Compromised blood supply of adjacent tissues limits the use of local flaps.

The improvement in the results have been achieved by the use of fibrin sealants e.g. fibrin glue as a second layer over the urethral repair.⁹ We have been using autologous platelet rich plasma patch as a sealant layer over the urethral repair.

Autologous platelet rich plasma patch is the rich serum containing different growth factors including fibroblast growth factor basic, vascular endothelial

growth factor and platelet derived growth factors⁹⁻¹⁰. Autologous platelet rich plasma enhances collagen synthesis, tissue repair and improves the wound healing and autogenesis.¹⁰⁻¹¹ The fibrin sealants which are commercially available are very costly. The autologous platelet rich plasma prepared from patient's own serum¹⁰ is cost effective and is better than the commercially prepared tissue sealants.

Total of 88 patients which under went repair of hypospadias between July 2017 to July 2018. The overall fistula rate is 11% which is quite less than the fistula rate observed before the use of this sealant layer.

Conclusion

Urethrocutaneous fistula is common and cumbersome complication after hypospadias repair. Incidence is even higher in mid penile and proximal penile hypospadias. The study carried out in the Department of Pediatric Surgery/ SIMS high lights reduction in rate of urethrocutaneous fistula by using autologous platelet rich plasma patch as water tight second layer over the hypospadias repair.

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