

Access this article online	
Quick Response Code:	Website: www.annalsafarmed.org
	DOI: 10.4103/1596-3519.76581

# Using methylene blue for perioperative localization of the hydrocele sac in boys

Page | 38

O. A. Sowande, T. A. Olajide

Paediatric Surgery Unit, Obafemi Awolowo University/Obafemi Awolowo University Teaching Hospital, Ile Ife, Osun State, Nigeria

**Correspondence to:** Dr. O. A. Sowande, Paediatric Surgery Unit, Obafemi Awolowo University Teaching Hospital, PMB 5538, Ile Ife, Osun State, Nigeria. E-mail: drshow286@yahoo.com

## Abstract

**Background:** Ligation of a patent processus vaginalis via the inguinal approach is the standard operative technique for the treatment of hydroceles in infants and children. Although a simple technique, identification of the processus vaginalis can be difficult even for the experienced surgeon.

**Aims:** To investigate the use of methylene blue in the perioperative identification of the patent processus vaginalis in a group of children presenting with hydrocele.

**Materials and Methods:** Twenty consecutive patients with hydrocele between the ages of 1 and 9 years were recruited for the study. Methylene blue 0.3-0.5 ml was injected slowly into the hydrocele fluid through the scrotal wall after aspiration, followed by routine ligation of the hydrocele track.

**Results:** The track of the processus vaginalis was clearly visualized in 17 (85%) of the patients, while in 3 (15%) patients no track could be seen, the hydrocele being localized to the tunica vaginalis. There were no cases of inadvertent testicular injury and there was no intraoperative complication. No patient reacted in any abnormal way to the methylene blue.

**Conclusion:** The technique helps in the identification of a patent processus vaginalis when it is present. It may be useful in cases where difficulty in identification of the hydrocele tract is anticipated in a child.

**Keywords:** Children, hydrocelectomy, methylene blue

## Résumé

**Fond:** Ligature d'une vaginalis de brevets processus via l'approche inguinale est la technique du dispositif standard pour le traitement de hydroceles chez les nourrissons et les enfants. Bien qu'une technique simple, identification de la vaginalis du processus peut être difficile même pour le chirurgien expérimenté.

**Objectifs:** Afin d'étudier l'utilisation du bleu de méthylène dans l'identification de périopératoire de la vaginalis de processus brevet dans un groupe d'enfants présentant une hydrocèle.

**Méthodes et matériaux:** Vingt patients consécutifs avec hydrocèle âgés de 1 à 9 ans ont été recrutés pour l'étude. Le bleu de méthylène 0,3 à 0,5 ml a été injectée lentement dans le liquide hydrocèle à travers la paroi du scrotum après aspiration, suivie de la ligature systématique de la voie de l'hydrocèle.

**Résultats:** La voie de la vaginalis du processus a été visualisée clairement à 17 (85 %) des patients, tandis que chez les patients de (15 %) 3 aucune voie ne pourrait être considéré, l'hydrocèle étant localisé à la vaginalis tunica. Il n'y a aucun cas de lésions testiculaires par inadvertance et il n'y n'avait aucune complication peropératoire. Aucun patient a réagi en aucune manière anormale au bleu de méthylène.

**Conclusion:** La technique contribue à l'identification d'un vaginalis processus brevets lorsqu'il est présent. Il peut être utile dans les cas où la difficulté dans l'identification des voies hydrocèle est prévue chez un enfant.

**Mots clés :** Enfants, hydrocelectomy, bleu de méthylène

## Introduction

A hydrocele is a collection of clear fluid within the tunica vaginalis. Hydroceles are classified as either communicating type (processus vaginalis remains patent) or non-communicating type. Ligation of a patent processus vaginalis via the inguinal approach is the standard operative technique for the treatment of hydroceles in infants and children. Although a simple technique, identification of the processus vaginalis can be difficult even for the experienced surgeon when the track is narrow and barely visible. Studies have shown that in 86% and 7%, respectively, the track of the hydrocele is narrow or obliterated, thereby increasing the risk of vessel and testicular injuries.<sup>[1]</sup> Safe separation of the processus vaginalis from the cord structures is a critical part of hydrocelectomy in children. The use of magnification, where available, may help in achieving this in small infants and children. A few authors have suggested the use of methylene blue or other vital dye injected into the hydrocele for intraoperative identification of the processus.<sup>[2-4]</sup> This approach is not widely practiced. We investigated the use of methylene blue in the perioperative identification of a patent processus vaginalis in a group of children presenting with hydrocele for surgery to determine the usefulness of the technique.

## Materials and Methods

Twenty consecutive children with hydrocele, between the ages of 1 and 9 years, were recruited for the study. Informed consent to participate in the study was taken from the parents. We asked for a history of allergy to any material, including methylene blue, before proceeding further.

Under general anaesthesia and after skin preparation and draping, 0.3-0.5 ml of 1 in 10 dilution of medical-grade methylene blue was injected slowly into the hydrocele fluid through the scrotal wall after aspiration. The scrotum was elevated for 2-3 min to allow the dye to gravitate into the processus vaginalis.

Through an inguinal incision, the inguinal canal was opened and the cord was delivered into the wound to look for the presence of methylene blue within the processus [Figure 1]. If no identifiable track was seen, the hydrocele was compressed to see if fluid would flow into the track. The operation was completed as per the standard procedure for hydrocelectomy in children. During surgery, care was taken not to rupture of the hydrocele sac to avoid a bluish discoloration of the operation site [Figures 2 and 3]. Postoperatively, the child was



Figure 1: Methylene blue is visible within the hydrocele sac.



Figure 2: Easy identification and dissection of the hydrocele track.



Figure 3: Almost complete dissection of the patent processus.

observed for any bluish discoloration of the buccal and oral mucosa

## Results

All the patients were boys with a median age of 5

years (range: 1-9 years). All the patients underwent primary hydrocele repair. The track of the processus vaginalis was clearly visualized in 17 (85%) patients, while in 3 (15%) patients there was no track seen, the hydrocele being localized to the tunica vaginalis. Further dissection within the cord did not reveal any remnant of the processus, suggesting vaginal hydroceles. In these boys, the history was suggestive of noncommunicating hydrocele. There were no cases of inadvertent testicular injury or any case of testicular atrophy during follow-up clinical examination, and there were no intraoperative complications. No patient had any reaction to the methylene blue.

## Discussion

Methylene blue is a commonly available dye that is used in general, urologic, and gynecological surgery for the identification of normal and abnormal tracts. The hydrocele tract represents the persistence of the processus vaginalis, which allows communication between the peritoneal cavity and the scrotum, thereby allowing fluid to gravitate into the scrotum. The logical treatment therefore is to ligate the patent processus vaginalis. Although the processus or the hydrocele tract occupies the anterosuperior aspect of the cord and can be easily identified by the experienced surgeon, hydrocelectomy or ligation of the patent processus vaginalis in children is still fraught with the danger of injury to the vas and the testicular vessels. The risk or actual incidence of testicular injuries following hydrocelectomy in children is not known. Injury to the vas deferens during pediatric hernia repair has been more clearly studied. Unilateral vessel injury occurs in approximately 10%-15% of patients, judging by the reported 2% incidence of azoospermia in patients with a history of bilateral hernia repair in childhood.<sup>[5]</sup> Steigman *et al.* found the vas deferens in inguinal hernia sacs in 0.14%-0.23% of patients<sup>[6]</sup> They observed that a small patent processus vaginalis can look identical to the vas deferens even to the experienced surgeon, and there is the risk of resection and ligation of the vas deferens if it is mistaken for a small sac. While magnification may help in difficult cases, a simple alternative is to outline the track with the use of a vital dye such as methylene blue.

A possible risk of the technique we used is inadvertent testicular injury; however, aspiration before injecting the dye prevents intratesticular injection or injury. In this series we did not observe

any case of testicular injury during the surgery. The technique we used is similar to that of Cassadana.<sup>[3]</sup> Others have suggested injection of the hydrocele tract after delivery of the sac and the cord. This may likely result in a higher incidence of leak and distortion of the operation site from staining. If there is a leak with our technique it is unlikely to be visible at the groin. Another factor to be remembered is that inability to demonstrate the dye beyond the tunica vaginalis does not mean that there is no proximal track. Some have suggested the use of retrograde dissection of the processus from the internal ring if there is a strong possibility of the existence of such a track. There was no uptake of methylene blue by the lymphatics and hence the hydrocele tract was clearly visualized. Methemoglobinemia is a potential risk but this commonly occurs following intravascular injection of a large amount of methylene blue, especially in a patient with glucose 6-phosphate dehydrogenase deficiency (G6PD). The volume we used was too small to cause this and no patient suffered any adverse effect in the immediate postoperative period or during follow-up

## Conclusion

The technique we have described helps in the identification of the patent processus vaginalis when it is present. It may be an alternative to the use of magnification in expectedly difficult hydrocelectomy in a child, especially in the developing country where facilities for magnification may not be available.

## References

1. Lym L, Ross JH, Alexander F, Kay R. Risk of contra lateral hydrocele repair or hernia after unilateral hydrocele repair in children. *J Urol* 1999;162:1169-71.
2. Calleary JG, Wiseman O, Masood J, Hill JT. Definitive identification of a patent processus vaginalis by intraoperative injection of methylene blue into the hydrocoele sac. *J Ped Uro* 2008;4:218-20.
3. Kim YS, Chung DY, Kim SJ. Use of Dye in Hydrocelectomy for congenital hydrocele with narrow communicating tract. *Ajou Med J* 1996;1:328-9.
4. Caffarena E. Improved technique for hydrocelectomy in children. *Urology* 1990;35:366.
5. Wantz GE. Complications of inguinal hernia repair. *Surg Clin North Am* 1984;64:287.
6. Steigman CK, Sotelo-Avila CM, Weber TR. The incidence of spermatic cord structures in inguinal hernia sacs from male children. *Am J Surg Pathol.* 1999;23:880.

Source of Support: Nil, Conflict of Interest: None declared.