# A modified technique of Duhamel procedure for the treatment of Hirschsprung disease ( anastomosis without suturing).

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## □ ABSTRACT □

***Back ground/ purpose*:** the aim of this study was to evaluate the long- term follow-up results of a modified technique of Duhamel operation for the treatment of Hirschsprung disease in 32 pediatric patients admitted in Al Assad and Tishreen university hospitals-department of pediatric surgery in lattakia-Syria,between the year of 2005- 2020

***Materials and Methods***: 32 pediatric patients with rectal and sigmoid aganglionosis have been operated by modified technique of Duhamel operation for HD, divided in three groups:

Group I: 4 patients operated by 3 stage procedure

Group II: 8 patients operated by two stage procedure

Group III: 20 patients operated by one stage procedure without colostomy

The modified technique is by using a special crushing clamp, which is placed on the posterior aganglionic wall of the rectum and anterior wall of ganglionic one of the normal colon after pull-through for fixation without suturing or utilizing any stapler.

The clamp will fell down after 5-7 days by aseptic necrosis, and a wide side-to- side anastomosis is completed

***Results***: Early postoperative complications were seen in four patients as minimal fecal soiling (one in group I, 1 in group II and two in group III respectively) which was disappeared after one month spontaneously. Functional results in all patients were good in 28 patients (87.5%), constipation was in two patients (6.25%), which controlled with high-fiber diet and an oral laxative.

**Conclusion:** this modified technique of Duhamel procedure is safe and easy performable with good results.

**Keywords:** Duhamel, Hirschsprung, crushing clamp, modified.

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# علاج داء هيرشبرونغ عند الأطفال بطريقة دوهامل المعدلة (مفاغرة بدون خياطة)

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## □ ملخّص □

**الهدف من البحث:** تقييم النتائج البعيدة لإجراء دوهامل المعدل في علاج داء هيرشبرونغ عند الأطفال

**طرائق البحث ومواده :** تمت الدراسة على 32 طفلاً مصاباً بداء هيرشبرونغ للسين والمستقيم والذين دخلوا إلى قسم جراحة الأطفال في مستشفيي الأسد الجامعي وتشرين الجامعي في مدينة اللاذقية ما بين عامي 2005–2020 .

تم تقسيم المرضى إلى ثلاثة مجموعات حسب طريقة العمل الجراحي:

مجموعة I : شملت 4 مرضى ،تم الإجراء الجراحي على ثلاث مراحل

مجموعة II : شملت 8 مرضى ، تم الإجراء الجراحي على مرحلتين

مجموعة III: شملت 20 مريضاً ، تم الإجراء الجراحي على مرحلة واحدة بدون فغر القولون .

الطريقة المعدلة هي باستخدام ملقط هارس، والذي يتم وضعه على الجدار الخلفي للمستقيم والجدار الأمامي للقولون السليم بعد استئصال القسم المصاب منه وإنزاله عبر شق خلفي لجدار المستقيم فوق الخط المسنن وتثبيته بدون خياطة، مسبباً تنخراً طاهراً وسقط بعد 5–7 أيام مع تشكل مفاغرة واسعة جانبية–جانبية .

**النتائج :** المضاعفات الباكرة بعد الجراحة حصلت عند 4 مرضى على شكل تلوث برازي بسيط والذي تلاشى بشكل عفوي بعد شهر من الجراحة،النتائج الوظيفية كانت جيدة جداً (87,5%) حصل إمساك عند مريضين فقط (6,25%) وقد عولج بالمليانات وبدون جراحة .

**الخلاصة :** هذا الإجراء المعدل لطريقة دوهامل آمن وسهل الإجراء مع نتائج جيدة جداً .

**الكلمات المفتاحية :** دوهامل ،هيرشبرونغ، ملقط هارس ، معدل .

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## Introduction:

Modifications of the Duhamel procedure have been numerous, including placement of the anastomosis above the internal sphincter to avoid incontinence [10].Most modifications have centered on the eliminations of the common wall of the rectal pouch "spur" and the influence of a stool-filled non-liminating blind rectal pouch with an aganglionic rectal wall.

We describe careful crushing clamp placement to entirely the rectal pouch. With application the mechanical crushing clamp to the rectal anastomosis, the division of the common rectal wall was further facilited.The aim of this study is to present our experience with this modification and evaluate efficacy and feasibility. The procedure does not damage the pelvic structures, it is not expensive and offers the best satisfying results in the surgical correction of HD.

## Methods:

Thirty-two pediatric patients with rectal and sigmoid aganglionosis have been operated by modified technique of Duhamel operation for HD, divided in three groups:

Group I: four patients operated by 3-stage procedure (colostomy, pull-through, colostomy closure).

Group II: eight patients operated by two-stage procedure (colostomy, colostomy closure with pull-through)

Group III: 20 patients operated by one stage procedure without colostomy.

The modified technique is by using a special crushing clamp, which is placed on the posterior aganglionic wall of the rectum and anterior wall of ganglionic one of the normal colon after pull-through for fixation without suturing or utilizing any stapler.

Rectal irrigation performed twice a day for 3 days prior to surgery, IVgentamicin and metronidazole are started the morning of the day of operation.

We prefer a vertical pararectal incision in the left lower quadrant of the abdomen. The ganglionic colon is mobilized, the peritoneal reflection on both sides of the rectum is incised, the ureters are identified and protected, and the vascular supply to the aganglionic rectosigmoid is divided.

Anterior traction on the rectum then exposes the presacral retro-rectal space. This space can be entered bluntly, and a tunnel can be created all the way to the floor of the pelvis by gentle insertion of the index finger or a small dissection sponge. The proximal ganglionated colon for pull- through is then divided from the portion of aganglionic intestine, the aganglionic part is resected, and the end of proximal intestine is closed.

we put a special crushing clamp (fig.1,2) one arm of the clamp is inserted into the lumen of the native rectum and another arm into the lumen of the ganglionic colon, after the confirmation of clamp position by palpation from the pelvis and abdomen ,the clamp is then closed firmly. The clamp will fell down after 5-7 days by aseptic necrosis, and a wide side-to- side anastomosis is completed. No drains were placed. the patient starts oral feeding 24-hours after the operation.

**( Fig.1) three sizes of clamps**

**( Fig 2) the steps of operation**

Rotine rectal dilatation is not performed, because the anastomosis is very wide, there were no evidence of stricture in our patients.

**Results**: (table 1)

Early postoperative complications were seen in four patients as minimal fecal soiling (one in group I, one in group II and two in group III respectively) which was disappeared after one month spontaneously. Functional results in all patients were very good in 28 patients (87.5%), constipation was in two patients (6.25%), which controlled with high-fiber diet and an oral laxative (table 2). The operative bleeding was minimal in group III. The mean operating time including the time for frozen section was 180 minutes in group III, which was shorter than in group I and II(328 and 225 minutes ,respectively). The dissection required freeing the stoma and the abdominal adhesions in patients of group I and II explain the extended operating time and increased operative bleeding in these two groups.

***Table 1 : Results***

| | Group I 3-stage laparotomy | Group II 2-stage laparotomy | **Group III One-stage laparotomy** |
|---|---|---|---|
| **Number of cases** | n= 4 | n= 8 | **n= 20** |
| **Age at operation : Mean** | (5.5 y) | ( 3.5 y) | **(2.4 y)** |
| **Range** | (3-7 y) | (1-7 y) | **(0.5 -5y)** |
| **Mean Operating (min):** | 328 | 225 | **180 (150 - 210)** |
| **Blood infusion (ml)** | 250 | 200 | **150** |
| **Complications** | 0 | 1 | **0** |
| **Follow up (years)** | 10-16 | 4-10 | **5 -1.5** |

***Table 2:Functional results***

| | group I | group II | group III |
|---|---|---|---|
| **Good** | 2 | 6 | 18 |
| **Incontinence** | 0 | 0 | 0 |
| **Constipation** | 1 | 1 | 0 |
| **Soiling** | 1 | 1 | 2 |

## DISCUSSION:

Surgical treatment for Hirschsprung's disease (HD) has changed recently.

Most of the affected children can be treated with a primary pull-through using minimally invasive techniques. Currently ,the 1-stage ,Swenson, Duhamel, and Soave pull-through procedures have been accomplished by laparotomy or laparoscopy[2,3,4]

The results are as good or better than those classically completed in 2 or 3 stage[7].

The 1-stage procedures, moreover, avoid the complications of colostomy and the costs of staged therapy [5, 6, 9]

We began using this procedure (Modified technique of Duhamel operation with crushing clamp instead of stapler) since1990 in our hospital.

We prefer to use this technique for the definitive treatment of Hirschsprung's disease when the infant approaching > 6 months .This patient size facilitates the pelvic dissection, accommodates mechanical crushing device, permits easy identification of the dentate line and completes the entire surgical management of HD,well before toilet training [1, 10]

Our preference for the Duhamel procedure is based on the same advantages Duhamel suggested in the past [8, 10]

In addition,not only are proprioceptive nerves preserved in the anterior wall of the true rectum, but the sensory transitional epithelium overlying the anorectal columns of Morgagni is protected as well.The anterior pelvic extrarectal nerves to the bladder and ejaculatory mechanism are also protected.

This procedure is safe, readily taught to surgical trainees and mechanically clamped anastomosis does not require a proximal diverting protective colostomy.

This procedure can be done for all forms of HD.

Rotine rectal dilatation was not performed for any patient in our study, because the anastomosis was very wide.

**Conclusion:** our results were very good, there is no constipation postoperatively in last group and this procedure allow early postoperative feeding (average of 24 hours). short hospital stay ,not more than one week (5-8 days), the crushing clamp can be used for many patients and no need for expensive staplers, and that makes a great difference for the patient and the hospitals during the late tight economical changes. No fecalomas are seen in our patients, because the wall in between is crushed.so we can use this modified technique of Duhamel procedure safely and easily performed and satisfying results.

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