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# Cost Effective Bedside Test for Early Detection of Stomal Necrosis in Resource Poor Settings - Tube Test

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***Abstract:***
***Background****: Stomal necrosis following stomal reconstruction may be due to venous congestion which can be managed conservatively or due to vascular compromise which warrants an redo-laparotomy for stomal revison. This paper describes an simple bed side test using an test tube and hand held flash light to determine the vascular integrity of the stoma. This technique is life saving, simple, safe and cost effective in resource poor settings.*
***Materials and Methods****: Patients who fulfill the inclusion criteria will be recruited for the study after obtaining informed written consent from the patient. Tube test will be performed. Effectiveness of using tube test in detection of stomal necrosis will be evaluated.*
***Results****: Study comprised of 19 male(76%) and 6 female(24%) patients. Out of the 25 patients who underwent ostomy reconstruction, 9 patients(36%) had double barrel ileostomy, 6 patients(24%) had loop colostomy, 5 patients(20%) had end colostomy, 4 patients(16%) had loop ileostomy and 1 patient(4%) had end ileostomy. Mean age of the patients was 44.2 years. Mean BMI of the patients was 23.82kg/cm2. Among 5patients who developed stomal necrosis 3 patients(12%) presented by (post operative day)POD-5, 1patient(4%) presented by POD-6 and 1patient(4%) presented by POD-7. Among the 25 study participants, 5 patients(20%) developed stomal necrosis; out of which 4patients (16%) had superficial necrosis and they underwent simple mucosal excision; and only 1 patient (4%) had deep necrosis for whom re-laparotomy was performed for stoma revision.*
***Conclusion:*** *Tube test is a cost-effective bedside procedure that can be used in resource poor settings to identify the stomal necrosis at the earliest. It helps to determine whether the stoma needs simple wound debridement rather than a major re-construction surgery based on the extent/level of necrosis.*
***Key Word****: stoma, tube test, mucosal excision, re-laparotomy*

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## I. Introduction

The creation of intestinal stomas is an integral component of the surgical management of several diseases involving the gastrointestinal tract. When created properly, an ileostomy or colostomy can dramatically improve a patient's quality of life. Conversely, when a patient develops complications related to their stoma, the impact on physical and mental health can be profound. Early complications include stomal ischemia/ necrosis, retraction, muco-cutaneous separation and parastomal abscess. Late complications include parastomal hernia, prolapse, retraction and varices[1].

Stoma necrosis is an early postoperative complication resulting from inadequate stomal blood supply that can occur in up to 13% of ostomates. Stoma necrosis is most commonly associated with colostomies, emergency operations, and obesity. Frequently, a stoma will appear mildly dusky in the immediate postoperative period; and it is important to distinguish between early venous congestion and arterial insufficiency. Venous congestion due to swelling or constriction of the stoma allows adequate arterial inflow but occludes venous drainage causing the stoma to swell and turn cyanotic or purple-colored. As postoperative edema subsides, venous outflow improves and the stoma will assume a normal postoperative hyperemic hue[2]. Rarely, edema and venous outflow obstruction can cause transient mucosal sloughing, which can be tolerated provided the underlying bowel wall is viable. However, inadequate arterial inflow will cause full-thickness necrosis and generally cannot be tolerated[3].

The main cause of stoma necrosis is devascularization of the bowel conduit used for stoma creation. Devascularization can occur due to ligation of the primary blood vessel to that segment of bowel, inadequate collateral blood flow or by excessive removal and dissection of peristomal mesentery[4] (i.e., "cleaning off" the mesentery). Often, full-thickness stoma necrosis does not become evident until several postoperative days. The

management of delayed postoperative stoma ischemia depends upon the proximal extent of ischemia. Immediate re-exploration and revision are necessary when stoma ischemia extends below (or proximal) to the fascial level. The proximal extent of ischemic changes can be assessed most effectively with endoscopy[5]. Conversely, in resource poor settings, a simple bedside examination using a flashlight and glass test tube allows evaluation of the most distal 5 to 6 cm of stoma mucosa.

## II. Material And Methods

***Design of study:*** Cross sectional study
***Duration of study:*** 6 months
***Period of the study***: March 2020 to September 2020
***Study centre:***
Department of General Surgery,
Chengalpattu Medical College & Hospital,
Chengalpattu.

***Study population:*** Patients who underwent elective and emergency intestinal stoma construction at Chengalpattu Medical College Hospital, Chengalpattu.

***Sample size:*** 25
***Inclusion criteria:***

- Patients who underwent elective and emergency intestinal stoma construction

***Exclusion criteria:***

- Age of the patient < 12years.
- Patients not willing to give a written informed consent.
- Patients undergoing stoma construction as an indication for gynecological disorder

***Methodology:***

- Patients who fulfil the inclusion criteria will be recruited for the study
- Tube Test will be performed
- Effectiveness of Tube Test in detection of stomal necrosis will be studied

***Tube test - procedure:***
It involves gentle insertion of a clear, lubricated test tube (blood collection tube) into the stoma, followed by shining a hand-held light into the tube to assess for color changes (figure 1); no adverse events have been reported when using this procedure. If the mucosa appears pink, it signifies healthy mucosa and if the appearance is black and it extends deep to rectus/fascial plane(figure 2), it requires surgical intervention[6].

***Statistical analysis:*** Both descriptive and appropriated inferential statistical analysis test was done. Data entry was done in MS excel sheet and statistical analysis done with SPSS version 16.

## III. Result

Study comprised of 19 male(76%) and 6 female(24%) patients(table 1). Mean age of the patients was 44.2 years and Mean BMI of the patients was 23.82kg/cm$^2$(table 2). Out of the 25 patients who underwent ostomy reconstruction, 9 patients(36%) had double barrel ileostomy, 6 patients(24%) had loop colostomy, 5 patients(20%) had end colostomy, 4 patients(16%) had loop ileostomy and 1 patient(4%) had end ileostomy(table 3). Among 5patients who developed stomal necrosis 3 patients(12%) presented by (post operative day)POD-5, 1patient(4%) presented by POD-6 and 1patient(4%) presented by POD-7(table 4). Among the 25 study participants, 5 patients(20%) developed stomal necrosis(table 5); out of which 4patients (16%) had superficial necrosis(figure 3) and they underwent simple mucosal excision(figure 4); and only 1 patient (4%) had deep necrosis(table 6) for whom re-laparotomy was performed for stoma revision.

| Gender | Frequency | Percent |
|---|---|---|
| M | 19 | 76 |
| F | 6 | 24 |
| **Total** | **25** | **100** |

Table 1 - gender distribution

| Factor | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|
| AGE | 13 | 69 | **44.2** | 15.737 |
| BMI | 18.7 | 32 | **23.82** | 3.8402 |

Table 2 - mean age and BMI

| TYPE OF STOMA | FREQUENCY | PERCENTAGE |
|---|---|---|
| DOUBLE BARREL ILEOSTOMY | 9 | 36 |
| END COLOSTOMY | 5 | 20 |
| END ILEOSTOMY | 1 | 4 |
| LOOP COLOSTOMY | 6 | 24 |
| LOOP ILEOSTOMY | 4 | 16 |
| **Total** | **25** | **100** |

Table 3 - type of stoma reconstruction done

| Day of presentation | Frequency | Percent |
|---|---|---|
| 5 | 3 | 12 |
| 6 | 1 | 4 |
| 7 | 1 | 4 |
| **Total** | **5** | **20** |

Table 4 - post op day of stomal necrosis

| STOMAL NECROSIS | Frequency | Percent |
|---|---|---|
| No | 20 | 80 |
| Yes | 5 | 20 |
| **Total** | **25** | **100** |

Table 5 - frequency of stomal necrosis

| EXTENT | Frequency | Percent |
|---|---|---|
| DEEP | 1 | 4 |
| SUPERFICIAL | 4 | 16 |

Table 6 - extent of stomal necrosis

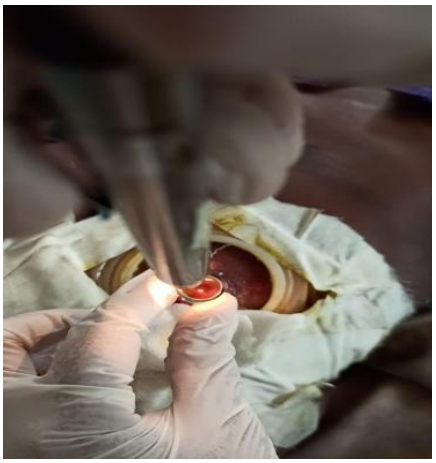

Figure 1 - the tube test

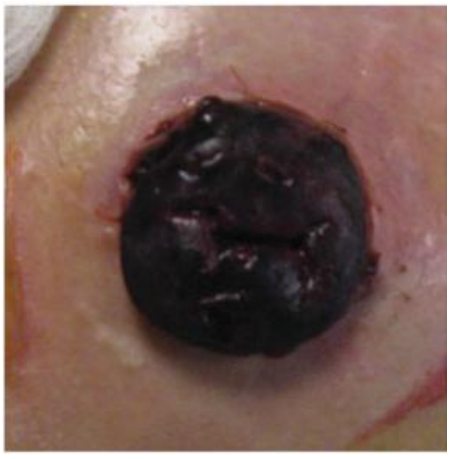

Figure 2 - complete stomal necrosis

Figure 3 - superficial necrosis with mucosal slouging

Figure 4 - following slough excision

## IV. Discussion

The construction of an intestinal stoma is fraught with complications and should not be considered a trivial undertaking . Vascular compromise represents the most serious early complication of stoma creation.

Assessment for possible ischemia and prevention of the devastating consequences of ischemia should take place well before leaving the operating room. Any question of compromised viability of the stoma must be addressed and revised at the initial operation.

Tube test is a simple bedside test for the early detection of stomal necrosis in the post operative period. When the degree of ischemia or necrosis extends to the subcutaneous level but remains above the fascia, one can expect stomal stenosis to eventually result and this can be detected early by daily monitoring of the stoma.

## V. Conclusion

Tube test is a cost-effective bedside procedure that can be used in resource poor settings to identify the stomal necrosis at the earliest. It helps to determine whether the stoma needs simple wound debridement rather than a major re-construction surgery based on the extent/level of necrosis.

## References

[1]. Kann BR, Cataldo TC. Early stomal complication. Clin Colon Rectal Surg 2002;15:191–198
[2]. Devi Mukkai Krishnamurty, MD1 Jeffrey Blatnik, MD2 Matthew Mutch, MD1. stoma complications. Clin Colon Rectal Surg 2017;30:193–200.
[3]. Formijne Jonkers HA, DraaismaWA, Roskott AM, van Overbeeke AJ, Broeders IA, Consten EC. Early complications after stoma formation: a prospective cohort study in 100 patients with 1-year follow-up. Int J Colorectal Dis 2012;27(8):1095–1099
[4]. Harris DA, Egbeare D, Jones S, Benjamin H, Woodward A, Foster ME. Complications and mortality following stoma formation. Ann R Coll Surg Engl 2005;87(6):427–431 5
[5]. Bafford AC, Irani JL. Management and complications of stomas. Surg Clin North Am 2013;93(1):145–166
[6]. Ahmad S, Turner K, Shah P, Diaz J. Using a Bedside Video-assisted Test Tube Test to Assess Stoma Viability: A Report of 4 Cases. Ostomy wound manage. Volume 62 - Issue 7 - July 2016:44-9.

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