

## Point of technique

# Staged abdominal repair (STAR) operation: How I Did it

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## ABSTRACT

STAR is a technique of serial operation, planned either before or during the first index operation and performed every 24 to 48 hrs or as required, with temporary closure of abdomen and ending in a final aponeurosis to aponeurosis closure of abdomen. During the course of treatment a controlled tension is exerted on the margins, avoiding an artificially caused Abdominal Compartment Syndrome due to intra abdominal inflammation, oedema, and ileus. Abdominal Compartment Syndrome (ACS) is defined as the sudden increase in the Intra-Abdominal pressure resulting in alternation in the respiratory mechanism, haemodynamic parameters, and renal as well as cerebral perfusion. Virtually all materials which are non reactive to the body tissue, can be used for temporary closure of abdomen. In my case I have used simple corrugated rubber drain sheet and drape to cover the abdomen temporarily.

## KEY WORDS

Abdominal Compartment Syndrome, Temporary abdominal coverage, Staged repair

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## INTRODUCTION

The effect of increased abdominal pressure on various organ systems has been noted over the past century. Recent research has confirmed the abdomen as a potential compartment with a capability to cause life-threatening local and systemic manifestations.<sup>4</sup> The effects are decreased cardiac output, pulmonary atelectasis, increased pulmonary peak pressure, oliguria to anuria and hepatic as well as intestinal reduction of perfusion. The concept of abdominal compartment syndrome has received attention of general surgeons very recently.<sup>4</sup> For the prevention and therapy of manifested Abdominal Compartment Syndrome (ACS), staged abdominal repair (STAR) operation is gaining more popularity, because of its lower complication rate. The indications are increased IAP > 20 mm of Hg with haemodynamic, respiratory and renal derangements. A good rule of thumb is that if, when looking at the abdomen horizontally, the guts can be seen above the level of the wound, the abdomen should be left open and temporary closure utilized.<sup>6</sup>

## CASE REPORT

A 48-year-old male patient was admitted in the hospital

with a history of severe pain abdomen for 7 days, absolute constipation for 5 days, not passing urine 1 day, and difficulty in breathing since last 10 to 12 hours. On general examination the patient was disoriented, had cold and clammy skin, with Pulse rate of 120/min, B.P.- 130/40 (wide pulse pressure), respiratory rate 30/min. On abdominal examination patient had tense and distended abdomen with severe guarding. Bowel sound were absent. Plain x-ray abdomen showed features of intestinal obstruction and chest x-ray showed small lung field with elevated diaphragms. Patient was planned for exploration after the primary resuscitation was over. Pre operative oxygenation was 55% with atmospheric pressure and 78% with oxygen mask Urinary Bladder Pressure was measured through folly's catheter, keeping Symphysis Pubis as the zero point. It was found to be 29 cm of water. Exploration was done through midline incision. General anaesthesia was given. Induction was done with thiopentone and maintained on O<sub>2</sub>, relaxant (atacurium) and N<sub>2</sub>O. A small perforation was found on the distal ileum with 3 to 4 litres of faecal contaminated peritoneal fluid. Small bowel was grossly oedematous and inflamed. Decision was taken to go for a STAR (staged abdominal repair) operation. Perforation was closed in two layers and peritoneal lavage given and two corrugated rubber

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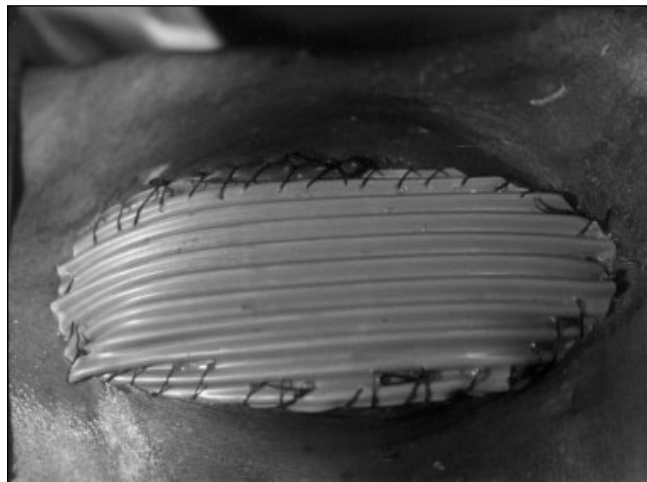


**Figure 1: Cotton drape covered over open abdomen**

drains kept, one in pelvis and the other in right flank. The abdomen was left open with a cotton drape sutured to the skin margin loosely to prevent evisceration of intestines. Pt was shifted to ward with dressings over it. The patient was brought to OT after 24 hrs and the drape was removed and a corrugated rubber drain sheet was stitched to the skin margin with a silk, under Ketamine anaesthesia. Both the times the rectus sheath margins were left untouched for future repair. This prevented the further increase in intra abdominal pressure, evisceration of bowel and drained the collected materials freely. Patient had a dramatic improvement in all systemic parameters, passed flatus on 5th postoperative day and stool on 6th day. On 8th day, under Ketamine anaesthesia, the corrugated rubber sheet was removed and an aponeurosis-to-aponeurosis closure was done with interrupted proline stitches. The patient's recovery was then uneventful and was discharged on 16th day of first operation.

## DISCUSSION

Staged abdominal repair in cases of abdominal compartment syndrome is gaining more and more acceptance amongst surgeons worldwide. According to Wittmann and colleagues STAR appears to reduce mortality by 50% over the standard operations and patients operated on at 24 hrs intervals seems to do better than those whose staged operations are performed at a wider interval.<sup>5</sup> STAR facilitates easy second look, stabilisation of the patient's general condition, decompresses the abdomen, and helps in organ recompensation. Looking in to the reduction in the mortality rate from 80%-90% to 30-40 %, different methods used for STAR is being considered in this discussion.<sup>1</sup>



**Figure 2: Corrugated rubber drain covering the abdomen**

Currently, no prospective studies are available to show which is the best method or material. Superiority of one over the other material has not been established. The materials advocated are Mesh (absorbable, non absorbable), Zipper, Adhesive sheets, Plastic bag (Bogota bag) and Velcro analog. Because of a very high rate of fistula formation and bowel erosions, use of mesh alone is discouraged. The incidence of this complication can be reduced by incorporating an adhesive foil (Op-Site) below it.<sup>1</sup>

The use of a non-adhesive plastic foil derived from irrigation bag (Bogota Bag) is quite satisfactory. These are sutured away from the skin margins, leaving the fascial margin untouched; for future repair.<sup>2</sup> The advantage of Bogota bag is that it is cheap and transparent, so that abdominal contents can be viewed through the plastic. This is particularly useful in cases with ongoing ischemia and necrosis of bowel and haemorrhage.

An alternative method is the 'Vacuum-pack' technique. Here the 3 litre genitourinary irrigation bag is opened and placed into the abdomen to protect the gut contents, under the sheath. Two large calibre suction drains are placed over this, and a large adherent steridrape placed over the whole abdomen. The suction catheters are connected to high-displacement suction to provide control of fluid losses and create the 'vacuum-pack' effect.<sup>6</sup> This minimizes the 'Wet bed' problem.

In my case I have used two materials, a drape towel and a corrugated rubber drain sheet. These material are easily available, and cheap, as compared to the

costly Mesh. There was absolutely no adhesion below the rubber drain and it allowed the collected materials to drain through its corrugations.

An open abdominal wound is a great challenge to a surgeon in the postoperative management, due to (i) massive fluid loss, (ii) heat dissemination, (iii) risk of infections. Frequent assessment and care of the wound and replacement of the lost fluids and electrolytes are mandatory. Strict aseptic technique is required for wound care.

## REFERENCES

1. Lonsoff JE, Richman BW, Jones JW. Temporary Abdominal Coverage, and reclosure of the Abdomen: Frequently asked questions. *J Am Coll Surg* 2002;195:105-15.
2. Schachtrupp A, Fackeldey V, Klinge U, Hoer J, Tittel A, Toens C, et al. Temporary Closure of Abdominal wall (laparostomy). *Hernia* 2002;6:155-62.
3. Majchrzak C. Abdominal Compartment Syndrome: A Case Review. *J Perianesthesia Nursing* 2002;17:413-9.
4. Sieh KM, Chu KM, Wong J. Intra Abdominal hypertension and Abdominal compartment Syndrome. *Langenbeck's Arch Surg* 2001;386:53-61.
5. Wittmann DH, Aprahamian C, Bergstein JM, Edmiston CE, Frantzides CT, Quebbeman EJ, et al. A burr-like device to facilitate temporary abdominal closure in planned multiple laparotomies. *Eur J Surg* 1993;159:75-9.
6. [www.trauma.org/traumabank.html](http://www.trauma.org/traumabank.html). Damage Control Surgery: Abdominal Compartment Syndrome.

## Forthcoming Events

EVENT DATE, VENUE CONTACT	JPGM GOLD CON: 50 years of medical writing - International conference on journal writing and publishing <i>September 23rd – 26th 2004, Mumbai, India.</i> Dr Atul Goel, Department of Neurosurgery, Seth G. S. Medical College, Parel, Mumbai - 400012, India. Tel: 91-22-24129884. Fax: 91-22-25032398, E-mail: <a href="mailto:goldcon@jpgmonline.com">goldcon@jpgmonline.com</a> . Web: <a href="http://www.jpgmonline.com/goldcon.asp">www.jpgmonline.com/goldcon.asp</a>
EVENT DATE, VENUE CONTACT	National Conference of Indian Association of Surgical Oncology & International Symposium on Advances in Oncology <i>September 24th – 26th 2004, Jaipur, India.</i> Dr Raj Govind Sharma, Organizing Secretary, Uniara Garden, Jaipur - 302004, India. Tel: 0141 2622783, 2620343. E-mail: <a href="mailto:rajraj1@sancharnet.in">rajraj1@sancharnet.in</a>
EVENT DATE, VENUE CONTACT	22nd World Congress of Endourology and SWL <i>November 3rd – 6th, 2004, Mumbai, India.</i> Dr. Mahesh Desai, Chairman, Dept. of Urology, Muljibhai Patel Urological Hospital, Nadiad - 387 001, Gujarat, India. Tel: +91-268-2520323 to 2520330, Fax: +91-268-2520248/2520331, E-mail: <a href="mailto:mrdesai@wce2004.com">mrdesai@wce2004.com</a> , <a href="mailto:mrdesai@mpuh.org">mrdesai@mpuh.org</a> , Website: <a href="http://www.wce2004.com">www.wce2004.com</a>
EVENT DATE, VENUE CONTACT	14th Biennial Conference Asian Pacific Association For Study of The Liver (APASL) with 13th Annual Conference of Indian Association for The Study of The Liver <i>December 11th – 15th, 2004, New Delhi, India.</i> Dr S. K. Sarin, President APASL. E-mail: <a href="mailto:welcome@apaslindia2004.com">welcome@apaslindia2004.com</a> , Website: <a href="http://www.apaslindia2004.com">www.apaslindia2004.com</a>
EVENT DATE, VENUE CONTACT	The 64th Annual Conference of the Association of Surgeons of India <i>December 26th to 30th, 2004</i> Dr Mohan Gupta, Organising Secretary, ASICON 2004 Aarogya Hospital, Twin City Market, 5-4-183 to 199, Moazam Jahi Market. Hyderabad - 500001, India. Tel: 0091-40-30903994, 55624687, Tele/Fax:0091-40-24744223, E-mail: <a href="mailto:asicon_2004@yahoo.com">asicon_2004@yahoo.com</a> / <a href="mailto:asicon20004@rediffmail.com">asicon20004@rediffmail.com</a>