



ISSN 2456-3110

Vol 5 · Issue 1

Jan-Feb 2020

Journal of  
**Ayurveda and Integrated  
Medical Sciences**

*www.jaims.in*

**JAIMS**

An International Journal for Researches in Ayurveda and Allied Sciences



**Charaka**  
Publications

*Indexed*

# Classification of Surgical Errors - Ayurvedic Viewpoint

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## ABSTRACT

Surgical error is described in the treatise of *Sushruta Samhita*, wherein it has been classified into four varieties, namely, an Insufficient procedure, a procedure done in excess, a procedure done by improper technique and lastly, during the procedure injury to the surgeon. This classification is unique, and is applicable to all streams of surgery. The former three types results in aggravation of the clinical condition, worsening of the pathological process and also will be fatal, hence, a surgeon must adhere to the core principles of Surgery as detailed in text and must possess theoretical and practical knowledge. The reasons for surgical errors as listed by Sushruta are *Ajnana* [Ignorance], *Lobha* [Greed], *Bhaya* [Fear], *Pramoha* [Nervousness or haste] and fear of being spurned or abused. Any surgeon who has deficiency of theoretical and practical knowledge, incomplete understanding of the subject, ill trained in judgment is sure to produce such errors.

**Key words:** Error, Surgery, Surgical Errors.

## INTRODUCTION

Medical and surgical errors has haunted life and health of an individual, instigated several legal confrontations and basically affected the motto of Health practice. The original written record on this topic is available in Ayurvedic treatises. A wealth of information on medical and surgical errors, treasured in Ayurvedic treatises has confined to Ayurvedic community; and has not spread across the globe. Past studies on this topic fails to recognize the facts cited

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Submission Date: 12/01/2020

Accepted Date: 18/02/2020

### Access this article online

#### Quick Response Code



Website: [www.jaims.in](http://www.jaims.in)

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in the texts of Indian medical science.<sup>[1-3]</sup>

The operative procedures performed across globe is grouped under the umbrella of eight surgical procedures - *Ashta Vidha Shastrakarma*<sup>[4-6]</sup> [*Ashta* - eight, *Vidha* - types, *Shastrakarma* - surgical procedure], namely, *Chedana* [Excision], *Bhedana* [Incision], *Lekhana* [Debridement or scapping], *Vyadhana* [Puncturing], *Eshana* [Probing], *Aharana* [Extraction], *Visravana* [Drainage] and *Seevana* [Suturing]. All procedures irrespective of each specialty descend under these eight types. An error during a surgical procedure is highly forbidden, yet its description is mentioned in order to avoid and also to highlight its impact on an individual's health.

These errors are classified into four major categories. The principle behind this classification is to keep it simple, reproducible, flexible and applicable to all forms of surgery performed across the globe. Classification of surgical complications in contemporary sciences - Clavien-Dindo classification of Surgical Complications.<sup>[7]</sup>

## AIM AND OBJECTIVE

To compile and analyze the complications born out of operative errors as classified by Sushruta.

## Method

The search was performed in October 2019 using Google Scholar. Key words searched were 'Insufficient excision', 'Insufficient incision', 'Insufficient debridement', 'Insufficient puncture', 'Insufficient probing', 'Insufficient extraction', 'Insufficient drainage', 'Insufficient suturing', 'Excessive excision', 'Excessive incision', 'Excessive debridement', 'Excessive puncture', 'Excessive probing', 'Excessive extraction', 'Excessive drainage', 'Excessive suturing', 'Improper excision', 'Improper incision', 'Improper debridement', 'Improper puncture', 'Improper probing', 'Improper extraction', 'Improper drainage', 'Improper suturing', 'Self inflicted injury' and 'injury to surgeon'.

Articles related to operative procedure were only screened. Articles not relating to the subject were excluded. The data extracted through searches were subjected to scientific analysis.

## OBSERVATION AND DISCUSSION

A huge number of adverse events related to errors in surgery are associated with the surgical procedure itself.<sup>[8]</sup> As detailed by Sushruta in his treatise, all the surgical procedures irrespective of the various surgical streams, are classified into eight operative procedures, namely, *Chedana* [Excision], *Bhedana* [Incision], *Lekhana* [Scraping or Debridement], *Vyadhana* [Puncturing], *Eshana* [Probing], *Aharana* [Extraction], *Visravana* [Drainage] and *Seevana* [Suturing].<sup>[9]</sup> This classification was taken as a base for analyzing the operative errors, thus the key words were prefixed with "Insufficient", "Excessive" and "Improper" words with each operative procedures.

### Definition and classification of complications:<sup>[10]</sup>

Operative complications are of four kinds;

1. *Hina Cheda* - Insufficient or Incomplete procedure
2. *Ati Cheda* - Excessive dissection

3. *Tiryak Cheda* - Improper technique

4. *Gatra Chedam Aathmana* - Self inflicting injury

### *Hina* - Insufficient or incomplete procedure

Insufficient excision gives rise to incomplete treatment, recurrence of the condition, impact on quality of life and socio-economical burden. Numerous researches highlight the hazardous consequences of insufficient or incomplete procedure.<sup>[11,12]</sup>

**Table 1: Depicts the effects the consequences of Insufficient procedure**

<b>Insufficient Excision [n -288]</b>
Recurrence of the condition <sup>[13-17]</sup>
Wound contraction and Cicatrization <sup>[18]</sup>
Procedure failure <sup>[19,20]</sup>
Spread or Metastasis <sup>[21]</sup>
Unsatisfactory cosmetic outcome <sup>[22,23]</sup>
Unightly scarring <sup>[24]</sup>
Failure in Diagnosis <sup>[25]</sup>
Precipitation of infection <sup>[26]</sup>
Extensive and destructive effect - Aggravation of existing pathological event <sup>[27]</sup>
<b>Insufficient Incision [n-63]</b>
Operative difficulties <sup>[28,29]</sup>
Procedure failure <sup>[30]</sup>
Recurrence <sup>[31,32]</sup>
Wound complications <sup>[33,34]</sup>
Infection <sup>[35]</sup>
<b>Insufficient debridement [n-227]</b>
Complications <sup>[36]</sup>
Failure of infection control <sup>[37]</sup>

Treatment failure <sup>[38]</sup>
Wound complications <sup>[39]</sup>
Recurrent infection <sup>[40]</sup>
Affects the intra operative decision <sup>[41]</sup>
Wound dehiscence <sup>[42]</sup>
Bleeding <sup>[43]</sup>
Results in varied pathological event <sup>[44]</sup>
Mortality <sup>[45]</sup>
<b>Insufficient Puncture [n-46]</b>
False diagnosis and Failure in diagnosis <sup>[46]</sup>
Mistakes in puncture cytology <sup>[47]</sup>
<b>Insufficient Probing [n-56]</b>
Failure to relieve the obstruction <sup>[48]</sup>
Precipitation of false track
Insufficient extraction
Repeat surgery <sup>[49]</sup>
Infection and spread of sepsis <sup>[50]</sup>
Incomplete removal
Recurrence <sup>[51]</sup>
Inaccurate diagnosis <sup>[52]</sup>
Secondary surgical pathological outcome <sup>[53]</sup>
Bleeding <sup>[54]</sup>
<b>Insufficient Drainage [n-3680]</b>
Stagnation of fluid <sup>[55]</sup>
Sepsis <sup>[56]</sup>
Recurrent surgery <sup>[57]</sup>
Inflammation <sup>[58]</sup>

Anastomotic leak <sup>[59]</sup>
Procedure failure <sup>[60]</sup>
Multi organ failure <sup>[61]</sup>
Mortality <sup>[62]</sup>
<b>Insufficient suturing [n-75]</b>
Cicatrization <sup>[63]</sup>
Intra operative complications <sup>[64]</sup>
Failure of surgery intended <sup>[65]</sup>
Recurrence <sup>[66]</sup>
Post operative complications <sup>[67]</sup>
Delayed or non healing of wound
Wound dehiscence

n- Number of searches screened.

#### **Ati or Procedure in excess**

Surgical procedure carried out in excess or operative instrument is inserted deeper than the specified limit is definite to injure the vital structures of the body. Such ignorant act by a surgeon in most cases results in instant death of the patient or severe deformity.<sup>[68]</sup>

**Table 2: depicts the effects the consequences of procedure in excess.**

<b>Excessive Excision [n-472]</b>
Deformity <sup>[69-72]</sup>
Blood loss <sup>[73-75]</sup>
Vital tissue loss <sup>[76]</sup>
Motor dysfunction <sup>[77-79]</sup>
Delays wound healing <sup>[80,81]</sup>
Large scar <sup>[82]</sup>
Failure of the procedure <sup>[83]</sup>

Cosmetic impairment <sup>[84,85]</sup>
Predisposes complication like fracture <sup>[86]</sup>
Wound dehiscence <sup>[87]</sup>
Vital tissue injury <sup>[88,89]</sup>
Affects the physiological function <sup>[90,91]</sup>
<b>Excessive incision [n-124]</b>
Post operative complications <sup>[92]</sup>
Excessive bleeding <sup>[93,94]</sup>
Vital structures injury <sup>[95]</sup>
Large scar <sup>[96]</sup>
Cosmetic ugliness
May interfere with normal function <sup>[97]</sup>
<b>Excessive Debridement [n-316]</b>
Skin and soft tissue defect <sup>[98]</sup>
Excessive tissue damage <sup>[99]</sup>
Unnecessary mutilation <sup>[100]</sup>
Compromises with positive outcome <sup>[101]</sup>
Precipitate secondary conditions <sup>[102]</sup>
Affects blood supply <sup>[103]</sup>
Delays healing <sup>[104]</sup>
Precipitate excessive inflammatory response <sup>[105]</sup>
<b>Excessive Debridement [n-294]</b>
Unwarranted loss of tissues <sup>[106,107]</sup>
Post operative complications <sup>[108]</sup>
Afflicts healing process <sup>[109]</sup>
Surgical trauma <sup>[110]</sup>
Inflammation <sup>[111]</sup>

<b>Excessive Puncturing [n-71]</b>
None of the studies related to the subject were found.
<b>Excessive Probing [n-354]</b>
Haematoma <sup>[112]</sup>
Extension of sepsis <sup>[113]</sup>
False track <sup>[114,115]</sup>
Perforation <sup>[116]</sup>
<b>Excessive suturing or Needless suturing [n-81]</b>
Obstructing natural passage <sup>[117]</sup>
Edema
Increased fibrosis <sup>[118]</sup>
Undue damage to adjoining structures <sup>[119]</sup>
Delayed wound healing <sup>[120]</sup>
Stricture formation <sup>[121]</sup>
Ischaemia and devitalization of tissue <sup>[122]</sup>
Foreign body reaction <sup>[123]</sup>
Big scar formation <sup>[124]</sup>
Circulatory failure in flap surgery <sup>[125]</sup>
Clot aggregation and thrombus formation <sup>[126]</sup>
Prevent drainage from the cavities <sup>[127]</sup>
Wound edge necrosis <sup>[128]</sup>
Improper tissue apposition with tissue strangulation <sup>[129]</sup>

**Tiryak Cheda [Improper technique]**

Improper technique involves procedures which have not adhered to the general principles of operative procedure. Such non adherence to surgical principles results in various pathological events and even can cause death.

In lobule repair *Sushruta* specifies to take incision on anterior side, if this rule is not followed, any other

side incision apart from anterior one, sure to result in multiple complications.<sup>[130]</sup>

**Table 3: Depicts the effects the consequences of improper procedure.**

<b>Improper Excision [n-120]</b>
Make operative procedure difficult and complex <sup>[131]</sup>
Recurrence <sup>[132]</sup>
Catastrophic loss of function <sup>[133]</sup>
Rapid spread of the tumor <sup>[134]</sup>
Cosmetic failure <sup>[135]</sup>
<b>Improper Incision [n-102]</b>
Injury to vital structures <sup>[136]</sup>
Wound gaping <sup>[137]</sup>
Hinder function of the part <sup>[138]</sup>
Disfigurement
Hypertrophic scar <sup>[139]</sup>
Deformity <sup>[140]</sup>
Delayed wound healing <sup>[141]</sup>
Skin damage <sup>[142]</sup>
Complexity of procedure <sup>[143]</sup>
Wound necrosis <sup>[144]</sup>
Increased risk of bleeding <sup>[145]</sup>
<b>Improper debridement [n-52]</b>
Undue tissue injury <sup>[146]</sup>
Failure of surgery <sup>[147]</sup>
Delayed wound healing <sup>[148]</sup>
Skin necrosis <sup>[149]</sup>
Abscess formation <sup>[150]</sup>
Fibrosis
Wound contracture
Spread of infection <sup>[151]</sup>
Inflammation <sup>[152]</sup>
Granulation tissue overlapping

<b>Improper Puncturing [n-13]</b>
Vital structures injury <sup>[153]</sup>
Inflammation
<b>Improper probing [n-72]</b>
False track <sup>[154]</sup>
Tissue injury
Stenosis <sup>[155]</sup>
Bleeding <sup>[156]</sup>
Error in Diagnosis
<b>Improper suturing [n-232]</b>
Incomplete and delayed healing <sup>[157]</sup>
Wound edge laceration <sup>[158]</sup>
Leakage <sup>[159]</sup>
Bleeding <sup>[160]</sup>
Wound dehiscence
Infection
Failure of procedure <sup>[161]</sup>
Thrombosis <sup>[162]</sup>
Poor take of the graft <sup>[163]</sup>
Scar contracture <sup>[164]</sup>
Stenosis <sup>[165]</sup>
Failure of anastomosis <sup>[166]</sup>
Impaired bloodflow <sup>[167]</sup>
Adhesion <sup>[168]</sup>
Tissue injury <sup>[169]</sup>
<b>Improper Extraction [n-406]</b>
Unwarranted tissue damage <sup>[170]</sup>
Perforation <sup>[171]</sup>
Recurrence

#### **Gatra Chedam Aathmana [Injury to self during a procedure]**

It is by far the most superfluous operative complication which must not happen. *Sushruta's*



mention of this type of error itself denotes the importance of proficiency, skill acquisition, and practice on dummy models to a surgeon in the art of surgery. The injury to surgeon during a procedure is mostly incidental, yet, its consequences are; self inflicted wounds, inflammation and exposure to potential risk of virulent organism.

At various instances of descriptions of operative procedures, the importance of theoretical knowledge, proficiency in clinical, surgical skills, precision has been highlighted. The reasons for surgical errors as listed by Sushruta are *Ajnana* [Ignorance], *Lobha* [Greed], *Bhaya* [Fear], *Pramoha* [Nervousness or haste] and fear of being spurned or abused. Any surgeon who has deficiency of theoretical and practical knowledge, incomplete understanding of the subject, ill trained in judgment is sure to produce such errors, hence Sushruta opines, such surgeons fail to perform the procedure efficiently, this principle is highlighted with an analogy, as one winged bird could not fly, similarly, such person ignorant of both theoretical and practical knowledge of surgery fails to perform his duties, in turn, they will be more lethal than the poison. Each operative error either worsens the clinical condition or can be fatal, thus, these errors should never happen.

## CONCLUSION

Operative errors are definite to result in morbidity or even death; hence a surgeon must be strengthen his surgical skills and update his knowledge constantly in order to avoid such errors. A major classification of such surgical or operative errors was first recorded in *Sushruta's* treatise, *Sushruta Samhita*. Injury to self during an operative event by a surgeon or his assistant is also grouped under this classification, this denotes his forethought. This classification is relevant from the days of its inception to lifetime. Surgeon should never make any injudicious or wrong procedure and utmost care to be taken to avoid these errors.

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**How to cite this article:** Sathish HS, Rashmi TM, Mithun B, Narmada MG. Classification of Surgical Errors - Ayurvedic Viewpoint. *J Ayurveda Integr Med Sci* 2020;1:172-182.

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

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