A Microbiological Study of Anterior Nasal Packs in Epistaxis

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Abstract

Bleeding per nose is one of the commonest ailment encountered by each and every otolaryngologist. Since hemostasis is immediate concern, anterior nasal pressure pack is put and is usually allowed to remain for 24-72 hours. Blood soaked pack and raw mucosal surface are good media for bacterial multiplication resulting in infection including sinusitis and sometimes toxic shock syndromes.

Present study is conducted to work out bacterial flora of anterior nasal pack and effect of systemic antibiotics in controlling it. Thirty cases of epistaxis of different etiology were included. Out of these 26 cases were positive on culture. These included *Staphylococcus aureus* 70%, *Pseudomonas aeruginosa* twenty three percent. *Klasiella pneumonia* and *proteus mirabilis* 3.3%, *Streptococcus* and *Hemolyticus* 3.3%. Details of type and duration of packing and its relation with organism cultured are discussed. It is concluded that the packing material should be soaked with antibiotics prior to use and should not be kept for more than 48 hours. And systemic antibiotics does not have any significant on this local infection due to packing.

Abbreviations

ANP : Anterior Nasal Pack TSS : Toxic Shock Syndrome

Bleeding nose is one of the commonest ailment which is very frequently encountered by each and every otolaryngologist. Commonest mode of hemostasis is by anterior nasal packing. A loose cotton or tape gauge soaked in paraffin, xylocaine or antibiotic ointment are commonly used for anterior nasal packing. Nowadays Calcium alginate soaked anterior nasal pack, nasal tampon, gelatin sponges are also used with aim to give pressure and achieve hemostasis. other modes of controlling epistaxis includes post nasal packing with ball gauge, Foley's catheter is also used as post nasal pack to give pressure at bleeding site. Despite all, commonest and easiest mean remains the anterior nasal packing.

Infection is one of the complication of anterior nasal packing. If anterior nasal pack is allowed to remain in nose for more than 48 hours this becomes infected and soaked with foul odorous discharge. Bacteremia,³ Toxic Shock Syndrome (TSS)⁴, Hypoxia⁵ has been reported following nasal packing. However little is

said about the local infection. It is known that many organism resides in the vestibule and nasal cavity as commonsal flora. Some of these micro-organisms in presence of foreign material, eg. anterior nasal pack; raw surface and blood becomes invasive resulting in infection and disease. Blood soaked anterior nasal pack acts as a very good culture medium for growth and multiplication of local commonsal flora.

Materials and Methods

Present study was conducted over total of 30 cases admitted in the Otolaryngology ward of Jaya Arogya Groups of Hospitals, Gwalior and Pravara Rural Hospital, Loni. In this study cases having epistaxis because of noninfective causes like hypertension, accidental trauma as well as cases which underwent surgery over nose were taken. Three cases with infective etiology were also included to see the effect of previous infection on growth of organisms on nasal packs. Routine E.N.T. checkup was done and when required X-ray PNS water's view was also taken.

Table I
Etiology of Epistaxis and Type of Pack Used for Hemostasis

Etiology of Epistaxis	No. of Cases	Type of Pack Used			
		Cotton Plain	Tape Gauge Plain	Tape Gauge Furacin	Neosporin
Hypertension Trauma	3	3	—	—	—
-Accidental	7	1	2	3	1
-Surgical	11	—	—	3	8
Bl. Disorder					
-Anemia	3	3	—	—	—
ITP	2	2	—	—	—
Fever	2	1	—	1	—
Rhinosinusitis	2	—	1	1	—
Total	30	10	3	8	9

Table II
Correlation of Organism Cultured with Type of Pack & Etiology of Epistaxis

Etiology Of Epistaxis	No. of Cases	Organism Cultured					
		Staph.	PS. Aer-	PR,	Kleb.	Mixed	Sterile
Hypertension Trauma	3	1C	2C	—	—	—	—
-Accidental	7	1N, 1F	1P	1F	1F	1C	—
-Surgical	11	6N, 1F	—	—	—	—	2F, 2n
Bl, Disorder							
-Anemia	3	—	—	—	—	3C	—
- ITP	2	—	—	—	—	2C	—
Fever	2	1F, 1C	—	—	—	—	—
Rhinosinusitis	2	1P, 1F	—	—	—	—	—
Total	30	15	3	1	1	6	4

** C- Cotton Pack, P- Tape Gauge Plain, N - Tape Gauge Neosporin,
F- Tape Gauge Furacin.

Packs were prepared with loose cotton gauge or tapegauge soaked in xylocaine or liquid paraffin with or without adrenaline. Antibiotic soaked packs were made with tapegauge soaked in Fuarazolidine (Furacin) or neosporin (Neosporin) ointment.

Following arrival of patients with epistaxis loose cotton pack soaked in lignocaine was applied and kept for 24 hours. Whenever it was anticipated that pack had to remain for more than 24 hours then packing is done with antibiotic soaked tapegauge anterior nasal pack. In all post-operative cases packing was done

with tapegauge soaked in antibiotic ointment. Also when bleeding could not be controlled by loose cotton anterior nasal pack, tapegauge packs were used. Packs were removed after 24-72 hours depending upon etiology and type of pack used. Before removing pack external nose was cleaned with antiseptic solution to prevent contamination. On removal of pack, condition of pack and any foul smelling discharge seen was noted. Middle part of the pack was then collected in a sterile bottle under total asepsis.

This pack was then immediately sent for culture and

Table III
Antibiogram of Bacterial Isolates

Organism	Antibiotic Sensitivity (Percentage)							
	Cipro	Cefo	Amika	Erythr	Carben	Peni	Genta	Cephal
Staph (n=21)	72	52	72	48	30	30	62	52
Pseudo (n=8)	62	50	75	75	25	38	75	25
Kleb (n=1)	100	100	100	R	R	R	100	R
Proteus (n=1)	100	100	100	R	R	R	100	R
Strepto (n=1)	100	100	100	100	100	100	100	100

sensitivity. Culture was done over Blood agar, MacConkey agar and colonies were then processed for identification of bacteria and their antibiogram study using carbencillin, Gentamycin, cefotaxime, erythromycin, tetracycline doxycycline, cloxacillin, ciprofloxacin, amikacin, norfloxacin, and cefoxime antibiotic disc by Kerby-Bouer's¹.

Of the 30 cases studied, three cases came with hypertensive epistaxis and hemostasis is achieved with loose cotton soaked in lignocaine. In 6 of 7 cases of traumatic epistaxis tapegauge soaked in lignocaine (n=2). Furacin (n=3) and neosporin (n=1). One case had loose cotton pack of lignocaine. In all the 11 cases which underwent surgery hemostasis was achieved with antibiotic soaked tapegauge pack (furacin n=3, neosporin n=8). In all 3 cases of Idiopathic thrombocytopenia loose cotton pack soaked in lignocaine was used. Two cases of fever had a loose cotton and furacin tapegauge pack each. Similarly both cases of rhinosinusitis had a pack of tapegauge soaked in lignocaine and furacin each. (Table - I).

During the packing period ampicillin is used as systemic antibiotic.

Observations

On bacteriological culture, out of 30 cultures done 26 were positive. In 4 cultures no organism was grown. These were the cases which underwent nasal surgery and had antibiotic impregnated tapegauge pack.

Coagulase positive *Staphylococcus aureus* were grown in 21 (70%) cases. In 6 cases other organisms were also present with *Staphylococcus aureus* (*Pseudomonas aeruginosa* n=5, *st. pyocynaceus* n=1). All six mixed growth was seen on loose cotton pack used for 24 hours used in cases of trauma (n=4).

Anemia (n=2) and ITP (n=2). In 25 cases where *Staphylococcus aureus* was grown as single organism, plain tapegauge (n=2). Furacin tapegauge (n=4) and neosporin tapegauge (n=7) were used, and packs were removed in 48 hours. Also all the loose cotton packs which were removed in 24 hrs. were positive with *Staphylococcus aureus* and drenched with foul smelling discharge, these were used in anemia and hypertension one case each. Plain tapegauge was used in 1 case of rhinosinusitis and trauma each. While furacin soaked tapegauge one case of rhinosinusitis, trauma, post surgery following drainage of septal abscess and in case of pyrexial epistaxis tapegauge soaked in neosporin (n=7) was used in 4 cases which under went septoplasty and 2 underwent excision of granuloma from nose and trauma.

Pseudomonas aeruginosa was grown in 8 cases, in 5 cases it grew with staph aureus while in 3 cases it grew alone, these were the cases of hypertensive epistaxis (n=2) and trauma (n=1) where two loose cotton and one plain tapegauge respectively were used. *Klebsiella pneumoniae*, *proteus mirabilis*, grew in one case each of accidental trauma where furacin tapegauge were used and removed after 72 hrs. (Table - II, III)

All the loose cotton packs become infective and foul odorous in 24 hrs. and three of the neosporin soaked tapegauge showed growth within 24 hours of packing without becoming odorous. Four of the antibiotic soaked pack which were removed within 48 hours of surgery were sterile, while seven of the packs removed in 48-72 hours were positive for *Staphylococcus aureus*. All the plain tapegauge pack removed after 48 hours became infective and drenched with foul smelling discharge and were positive for *Staphylococcus aureus* (n=6), *Pseudomonas aeruginosa* (n=1).

On antibiogram, *Staphylococcus aureus* was highly susceptible to ciprofloxacin 70%, cefotaxime 50%, amikacin 70% and norfloxacin 40%, erythromycin 40%, and moderately sensitive to gentamycin 60%, cephalixin 50%, *Pseudomonas aeruginosa* was highly susceptible to amikacin 80%, ciprofloxacin 60%, gentamycin 70%, *Pr. mirabilis* and *klebsella* were highly sensitive to amikacin and cefotaxim and moderately to gentamycin ciprofloxacin and norfloxacin.

On laboratory examination mean erythrocytic sedimentation rate following packing increased and was 27.8 mm in 1st hr. In 3 cases where/ere packs were allowed to remain for more than 72 hrs. it was 45, 50 and 56 mm in 1st hr. Total leucocyte count on average was in normal range i.e. 87.33/ mm² and polymorphonuclear leucocytes were 65.33%. Also in two cases where packs were removed after 72 hrs. sinuses were hazy on radiographs.

Discussion

Anterior nasal packing, though simplest and commonest mode of controlling any type of bleeding but is not free of complications. These complications range in severity from being an uncomfortable feeling⁵, local infection, bacteremia³, septic shock², obstruction of airway⁴ and other life threatening situations. Any pack if allowed to remain for more than 48 hours, clinically shows foul odor and discharge³ and sometimes due to blockage of ostia by pressure, edema and inflammation; even sinus becomes hazy on x-ray⁴.

Infact, none had thought of local infection produced by nasal pack remaining in nose for long time. In presence of raw area or dehiscence in mucosa toxins as well as bacteria may get absorbed in circulation. This may result in fatal bacterimia or septicemia or both³. Similar bacteremia has been reported following dental surgery². Sometimes even TSS can develop following absorption of toxins. Thomas stephen W (1982), reported a case where patient developed TSS in post operative period following Septorhinoplasty. Where TSS was caused by the absorption of toxin produced by *Staphylococcus aureus*. *Staphylococcus aureus* is normally present in nose of (30-50%) as comonsal. This in presence of pack and blood may proliferate and may produce toxins. This is also

proved by our study where out of 30 cultures 21 (70%) grew staph, aureus and in them potential for TSS were very high. This figure is well above the carrier rate of *Staphylococcus aureus* (30-50%) reported in literature. his indicate that in presence of contributing factors, these patients with *Staphylococcus aureus* had high risk of development of toxic shock syndrome.

Four of the antibiotic soaked packs removed in 48 hrs from post operative cases were sterile. Except the 9 post operative cases all packs removed in 48 hours had foul odorous discharge. Similarly all loose cotton packs irrespective to the duration had foul odorous discharge. This shows that antibiotic soaked packs inhibit the growth of bacterial flora.

Herzon (1977) has described that 12% of his study group developed bacteremia and one patient had clinical septicemia and died after nasal packing. All the packs in his study were positive for micro-organisms.

Gram negative bacilli was grown on seven loose cotton nonantibiotic pack and two tapegauge with antibiotic. Alteration of naso-bacterial flora by antibiotics is well established. Johnson et al (1972) had cultured Gram negative bacilli from 45% of their hospitalized patients in their study of 213 cases. They also had presumed that antibiotic therapy had promoted colonization. In our study 33% of cases grew Gram negative bacilli. Predominantly *Pseudomonas aeruginosa* is seen, which is normally present in hospital environment and suppression of nasal flora may had proliferated.

Haffner et al (1950) had shown that in patients with conversion of flora to Gram negative bacilli required prolong hospitalization. This change in flora was predominant in nonantibiotic group, and only two cases of antibiotic tapegauge pack showed Gram negative bacilli; *Klebsella* and *proteus* each.

Though all cases received systemic antibiotic, no significant effect was seen on bacterial profile of nasal pack. In our study out of 18 antibiotic soaked packs 4 (22%) were sterile even after 48 hrs. of packing.

Even clouding of maxillary and other sinus may develop on long term placement of pack in nasal cavity, as seen in 2 of our cases. Also it can be added that probably it becomes unnecēsary and detrimental

to use systemic antibiotic in patients with nose bleed, due to noninfective etiology. Though sometimes in post-op period systemic antibiotics are required, but it is the use of antibiotic nasal pack with early removal is recommended. Thus minimizing potential of infective complications.

All the 9 loose cotton packs became foul odorous and were drenched with mucopurulent discharge.

Microbial culture was obtained from these packs. This may be said that one should avoid the use of plain loose cotton pack as well as plain tape gauge pack in day to day practice. Also one should not allow, even an antibiotic soaked pack to remain in nose for more than 48 hrs. Finally it is concluded that its the duration of packing and type of pack used determines the status of local infection.

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Congratulation

Dr. Arun K. Gadre, a life member of our Association, completed a 6 years intensive residency training programme in Otolaryngology, Head & Neck Surgery in the University of California Davis Medical Center between July 1992 and June 1998.

During this period he received the following award :-

1. Lahey Clinic Alumni Association Post Graduate Recognition Award for Outstanding Achievement, Massachusetts June, 1992.
2. Bay Area Residents Research Symposium, Oakland CA: Grand Prize for Arterial Supply of Human Endolymphatic Sac June, 1994.
3. President's Award for Scientific Exhibit at Meeting of American Academy of Otolaryngology, Head & Neck Surgery for work on Skull Base Approaches for Management of Distal Carotid Aneurysms, New Orleans September 1995.
4. Outstanding Teaching Award, for 1995-1996, U. C. Davis Medical Center, June 1996.
5. Alpha Omega Alpha Honor Medical Society Award, 1996.
6. Outstanding Teaching Award for 1997-1998, U.C. Davis Medical Center, June 1998.
7. Scholarship Recipient, 10th Annual Head & Neck Reconstruction Course, Mount Sinai Medical Center, New York, March 1998.
8. Coauthored with Prof. Dr. Paul Donald a chapter in the prestigious Head & Neck Surgery Text-book, Comprehensive Management of Head & Neck Tumours, 2nd Edition by Thawlwly S. E. & Panje W. R. 1998.

He is currently Clinical Fellow in Neurotology at New York University Medical Center, Specializing in Cochlear Implants and Skull-Base Surgery.

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