Vidian Neurectomy

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November/2015
Vidian neurectomy

- History
- Anatomy
- Indications
- Approaches
- Literature review
History

- **Golding-Wood** first described vidian neurectomy (VN) in the early 1960s.

- Various approaches were developed thereafter, including:
  - Transseptal by Chandra in 1969
  - Transpalatal by Gregson in 1969
  - Transantral by Minnis and Morrison 1971

- Due to the complex anatomy and vital structures surrounding the vidian nerve this techniques were abandoned for almost 20 years after Golding-wood.
The trans-nasal approach had been advocated with the help of an operating microscope and diathermy coagulation since the 1980s by Krajina.

It was proposed as a faster, less invasive and with a lower complication rate.

Most of these approaches were based on cauterization of the vidian nerve.
History

- In the 1990s, the endoscope was introduced and facilitated the same procedures in the pterygopalatine fossa (el Shazly 1991; Kamel and Zaher 1991)

- The use of the endoscope allowed precise localization and transection of the nerve instead of caurization

- The two main difficulties were encountered:
  - Bleeding (from SPA)
  - Working in a relatively narrow operative field
Robinson and Wormald in 2006 were the first ones who took advantage of \textit{sphenoid sinus as guidance}
It is also known as **nerve of pterygoid canal**.

formed by **post** synaptic **parasympathetic** fibres and **pre** synaptic **sympathetic** fibres

The following nerves combine together to form the vidian nerve

1. **Greater petrosal nerve** (preganglionic parasympathetic fibers)
2. **Deep petrosal nerve** (post ganglionic sympathetic fibers)
3. **Ascending sphenoidal** branch from otic ganglion
Anatomy

- formed **at the junction** of greater petrosal and deep petrosal nerves
- This area is located in the cartilagenous substance which fills the foramen lacerum
- Pass anteriorly through the pterygoid canal accompanied by artery of pterygoid canal
Anatomy

- Then ascending branch from the otic ganglion joins this nerve.
- The vidian nerve exits its bony canal in the pterygopalatine fossa where it joins the pterygopalatine ganglion.
Vidian canal

- It is a short bony tunnel close to the floor of sphenoid sinus
- It transmits vidian nerve and artery from foramen lacerum to pterygopalatine fossa
Based on the position of vidian canal in floor of sphenoid sinus in CT scans, vidian canal is classified into 3 types:

- **Type 1** – vidian nerve is seen entirely in floor of sphenoid sinus
- **Type 2** – vidian nerve is partially embedded in floor of sphenoid sinus.
- **Type 3** – vidian nerve is completely buried inside floor of sphenoid sinus.
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Physiology

- The vidian nerve provides the main parasympathetic supply to the nasal mucosa and maxillary sinus mucosa.
- Stimulation of this nerve causes secretory and vasodilatory effects in animals.
Histological changes induced due to stimulation of vidian nerve include:

I. Enhanced *secretory activity* of nasal mucosal glands
II. Intense *vasodilatation* of deep venous plexus
III. Increase in the periglandular *blood supply*
IV. Intense *degranulation* of mast cells
Indications

- No absolute indications exist
- Considered if despite full medical management with:
  - The symptoms interfere with daytime function
  - Adversely impact sleep
  - Cause a decline in global or specific quality of life
- Originally designed for vasomotor rhinitis
- Some advocate a possible role in nasal polyposis and CRS
- Variety of headache and autonomic disturbances e.g. cluster headache
Relative contraindications

- Absence of sphenoid pneumatization \textit{(conchal type)}
- Presence of osteomyelitis of the sphenoid bone
- Decrease lacrimation or dryness
- Active infection
Preoperative computed tomography evaluation

- CT images thin cuts (3 mm or less) and directed in the coronal, sagittal and axial planes using a bony algorithm.

- Pre-surgical CT evaluation involves analysis of six specific anatomic areas to avoid possible complications during surgery:
  - Sphenoid sinus
  - the pterygoid process
  - bony vidian canal continuation and relation to sphenoid sinus
  - Anterior vidian canal relation with posterior end of mid turbinate
  - Foramen rotundum and palatovaginal canal
  - Septum and turbinates
Types of endoscopic approaches

- **Type 1** – Unroofing the prominence over the vidian canal in the floor of sphenoid sinus

- **Type 2** – If prominence is absent or lateralized, removal of partial sphenoid wall and pterygoid process to expose vidian canal
Sphenoid sinus

- The pattern of pneumatisation
  - Seller
  - Pre-seller
  - Conchal – more difficult to do type 1

- Presence of intra-sinus septum
  - Remove to access the floor
  - Mind the lateral attachment of the septum
  - Watch for carotid & optic nerve dehiscence
The pterygoid process

- The anterior opening of the vidian canal is positioned on the **superomedial part** of the anterior surface of the pterygoid process,
- at the **level of the floor of the sphenoid** sinus and **inferomedial** to the foramen rotundum.
The relationship between the canal and the sphenoid bone (canal corpus type) can be categorized as follows:

1. embedded inside the sphenoid corpus
2. partially protruding
3. connected to the bone with a stalk inside the sinus
The relationship between the canal and the sphenoid sinus floor (canal floor type) is categorized as follows:

1. the floor is flat, and the canal is at the same level as the floor
2. the floor is upsloping, and the canal is superior to it
3. the floor is down sloping
4. The canal is inferior to it, and the floor is an inverted V shape
Relation with med turbinate

- The anterior opening of the vidian canal is usually positioned at the superiolateral aspect of the posterior end of the middle turbinate.
- An angel between the two can predict the failure rate.
- The greater the angle the greater chance of failure.
- Opening medial to med turbinate has risk of mucosal disruption and brisk bleeding for SPA.
Foramen rotundum and palatovaginal canal

- the foramen rotundum on the lateral side
- the palatovaginal canal on the medial side (38% b/l, 20% uni)

should be identified, to prevent it from being mistaken for the vidian canal
Septum and turbinates

- presence of extreme septum deviation and the relative size of middle and inferior turbinate will effect the surgical feasibility
- Choosing an easy side to approach is recommended
- Might need to do combined septoplasty and turbinate reduction
Approaches for vidian nerve:

- Trans-nasal preganglionic vidian neurectomy
- Intra-sphenoidal vidian neurectomy
- Trans-palatal vidian neurectomy
- Trans-septal vidian neurectomy
- Endoscopic posterior nasal neurectomy
- Endoscopic vidian neurectomy
Transnasal preganglionic vidian neurectomy

- Position of the patient is same like any of the nasal surgeries
- Nose is Decongested
- Incision is made in the lateral nasal wall just anterior to the ethmoidal crest
- Ethmoidal crest is removed thus exposing sphenopalatine foramen then widened
Transnasal preganglionic vidian neurectomy

- A curved probe is passed into the funnel shaped pterygoid canal and the nerve of pterygoid canal is cauterised.

- Major complication is **ophthalmoplegia** due to the probe sinking deep into the pterygoid canal thus damaging the adjacent **abducent nerve**.
Intrasphenoidal vidian neurectomy

- The sphenoid ostium is identified in the spheno-ethmoidal recess
- Then widened with kerrison’s punch
- Vidian canal is identified in floor of the sinus
- Bony canal wall if thin is removed, exposing the vidian nerve
- Vidian nerve is transected and removed under direct vision
- Preoperative CT mandatory
Transpalatal vidian neurectomy

- Complications:
  - palatal fistula
  - Injury to internal carotid artery can occur over foramen lacerum
Trans septal vidian nurectomy

- SMR is done
- The mucoperiosteum in spheno-ethmoidal recess is elevated further laterally exposing:
  - sphenoid osteum
  - sphenopalatine foramen (lower down)
- vidian nerve is identified emerging from the canal and it is cauterised
Endoscopic posterior nasal neurectomy

- In this procedure superior and posterior nasal nerves are resected as they exit from the sphenopalatine foramen
- Procedures steps similar to trans nasal approach
- Main disadvantage is Recurrence which is more common (2 months average)
Endoscopic vidian neurectomy

- Antegrade approach, (from intrasphenoid vidian canal to PPF), has been introduced recently in Taiwan in 2010

- Two common antegrade nerve resection fashions (by Su and Wang)
  - Type 1 – Unroofing the prominence over the vidian canal in the floor of sphenoid sinus
  - Type 2 - if prominence is absent or lateralized, removal of partial sphenoid wall and pterygoid process to expose vidian canal
Endoscopic vidian neurectomy Technique

- semi-Fowler’s position
- Pledges to decongest the nasal mucosa
- Head of mid turbinate gently lateralized
- Opening sphenoid ostium and widening inferolateraly (watch for spa)
- 30-70 degree scope to identify vidian canal usually on the floor
- Transection of the nerve is performed using an angle probe when direct vision can be obtained (type 1)
Technique

- If there is no bony protrusion inside the sphenoid sinus floor as a visual guidance or the access to the vidian canal is hampered by the pterygoid process
- The approach is extended laterally by removing the pterygoid process around the vidian canal opening
Technique

- If the gap between sphenoid sinus wall and pterygoid process allows the passing through of a curved probe, the vidian nerve will be hooked out by the probe or sickle knife.

- If the gap is too narrow to allow this procedure, the pterygoid process will be partially removed to discover the anterior opening of the vidian canal.
Technique

- The vidian nerve can be usually stretched out of the canal opening as long as 2 centimetres and even more.
- Resection (precise nerve cut) plus cauterization of the nerve ends will follow it.
- If canal opening isn’t accessible due to severe obstruction by pterygoid process monopolar cauterization can be used to dysfunction the vidian nerve.
Postoperative care

- During the initial postoperative period there is:
  - inflammation
  - Edema
  - mucociliary clearance disrupted
  - thereby increasing the risk of scar formation and development of postoperative sinusitis
  - Continued medical therapy in the postoperative period is still beneficial
Outcomes

- Surgical outcomes of VN are generally good.
- Published Success rates range from 50% to 90%, with significant improvements in both symptomatology and general health status.
Literature review
to evaluate the effect of vidian neurectomy on nasal symptoms and tear production, and to assess for possible complications.

Six patients with intractable rhinitis who underwent endoscopic transnasal vidian neurectomy

The degree of symptom improvement and complications were assessed through retrospective review of medical records prior to, and 1 year following surgery, and telephone survey after 6.9±2.1 years.

Schirmer's test was performed before surgery, and these values were compared to postoperative results at 1 day, 1 month, and 2 months.
Results:

- Changes in the visual analogue scale were significant in:
  - **Nasal obstruction** (8.5±2.5 to 3.0±2.0, \(P<0.05\))
  - **Rhinorrhea** (9.0±2.2 to 2.0±1.6, \(P<0.05\))

- Improvements persisted for up to 7 years after the primary surgery

- Patients complained of mild dry eyes for 1 month after vidian neurectomy

- Five out of six reported marked improvement of xerophthalmia after 2 months
Aside from mild crusting of the nasal cavity and mild postoperative pain, there were no major complications.

During the entire follow-up period, no patient needed additional treatment, such as antihistamines or corticosteroids.
OBJECTIVE: To evaluate the long-term efficacy of bilateral endoscopic vidian neurectomy in the management of moderate to severe persistent allergic rhinitis.

Design: prospective

A total of 236 patients with moderate to severe persistent allergic rhinitis were divided into 3 treatment groups.
Long-term results of bilateral endoscopic vidian neurectomy in the management of moderate to severe persistent allergic rhinitis.


- **Group 1** - bilateral endoscopic vidian neurectomy (n = 93)
- **Group 2** - partial inferior turbinectomy and/or septoplasty (n = 51)
- **Group 3** - received conservative therapy (controls, n = 92)

- **Main outcome measure:** Quality of life was assessed at 6 months, 1 year, and 3 years after undergoing the initial selected treatments, complications were observed after treatment.

- Using **Rhinoconjunctivitis Quality of Life Questionnaire and visual analog scale**
RESULTS:

- Group 1 average post treatment score of QOLQ and VAS significantly improved in 6 months, 1 year and 3 years with comparison with pre-treatment score (P < 0.00)
- Same for group 2 and 3
- Percentages were significantly higher for those in group 1 than for those in group 2 (P < .05)
- No severe complications in any of the groups
CONCLUSION: In the hands of a well-trained surgeon bilateral endoscopic vidian neurectomy is an effective and safe technique in the management of moderate to severe persistent allergic rhinitis.
OBJECTIVE: To evaluate the efficacy of endoscopic vidian neurectomy in the management of moderate-severe persistent allergic rhinitis, and to explore its possible mechanism.

METHODS: One hundred and ninety-one patients with moderate-severe persistent allergic rhinitis were divided into three groups:

- **group A**: endoscopic vidian neurectomy was carried out in 71 patients
- **group B**: partial inferior turbinectomy and/or septal-plasty in 39 patients
- **group C**: control 81 patients
The life quality was assessed at 6 month, 1 year and 3 years after operation using:

- Rhinoconjunctivitis quality of life questionnaire (RQLQ)
- Visual analogue scale (VAS)
RESULTS:

- The average score of RQLQ and VAS score were significantly decreased at:
  - 6 months (0.84 ± 0.41, 2.55 ± 1.57)
  - 1 year (0.91 ± 0.43, 2.63 ± 1.71)
  - 3 years (1.03 ± 0.46, 2.81 ± 1.75)

- after endoscopic vidian neurectomy than scores before operation $P < 0.001$

- significantly lower than scores in patients in group B or control group at the same period after treatment.

- No serious complications observed in any group
Thank you
Scratch Test: scratch skin with placement of allergen or scratch with allergen, has largely been replaced for more objective and more reliable techniques •

Prick Test: series of allergens are inserted by needle into skin, positive “wheal-and-flare” reactions are compared to controls; rapid and safe test, risk of anaphylaxis, misses less sensitive allergy, grading is subjective •

Intradermal Test: similar to prick test except allergen is placed intradermally; more sensitive than prick test, however, more time-consuming and painful, risk of anaphylaxis, and subjective grading

Skin Endpoint Titration: series of increasing concentrations of specific allergen are introduced intradermally to titrate to a positive response, useful for determining immunotherapy concentrations, highly sensitive and determines quantitative measurements, however, time-consuming
In Vitro Allergy Testing.

Radioallergosorbent Test (RAST): serum reacts with a series of known allergens, radiolabeled anti-IgE identifies specific antigen-IgE complexes.

Enzyme-linked Immunosorbent Assay (ELISA): similar to RAST except fluorescing agents are used for markers of antigen-IgE complexes.