# HealthNews DIGEST

APRIL 2024




Aster HOSPITALS & CLINICS

We'll Treat You Well

## Dr. Sherbaz Bichu

CEO & Specialist Anaesthetist
Aster Hospitals & Clinics, UAE

On behalf of Aster's leadership, I am delighted to welcome you to the 20th edition of HealthNews, our esteemed newsletter that has been providing valuable insights and knowledge to our medical community. This newsletter's success is a testament to the hard work and dedication of our team of doctors, who have contributed their time and expertise to make this happen.

The case studies and articles featured in each edition of HealthNews have been truly unique and insightful, providing valuable information that has aided us in our daily practice. I want to express my sincere appreciation to all the contributors who have shared their experiences and knowledge with us.

As medical professionals, we are constantly learning and evolving, and HealthNews has been a valuable resource for us to stay up-to-date with the latest developments in our field. It has helped us stay informed and connected with our peers, fostering community within our healthcare organization.

I look forward to the continued success of HealthNews and to the collaboration in providing the best possible care to our patients.

## Dr. Ramanathan V

Medical Director
Aster Hospitals & Clinics, UAE

As the Medical Director for Aster Hospitals and Clinics, I am thrilled to extend my warm congratulations to all of you on the 20th edition of HealthNews. I am proud of the hard work and dedication of our team of doctors, who have tirelessly made this newsletter a valuable resource for our medical community.

The articles and case studies featured in each edition of HealthNews have been challenging yet informative, helping us to better understand complex medical conditions. It has helped us to improve our knowledge and skills, which in turn has led to better patient outcomes.

It's a great pleasure to see that expanding clinical knowledge and experience through this newsletter has received resounding support and commitment from our medical fraternities and allied health professionals. Let's keep the momentum going as we travel through this fascinating learning via HealthNews Digest together.

**Dr. Deepak Janardhan**
E.N.T, Head &
Neck Surgery (Specialist)

**Dr. Bharath Rao**
E.N.T, Endoscopic Nasal &
Micro Ear Surgery (Specialist)

# Successful Removal of Migrated Fishbone to Thyroid Lobe at Aster Hospital, Mankhool

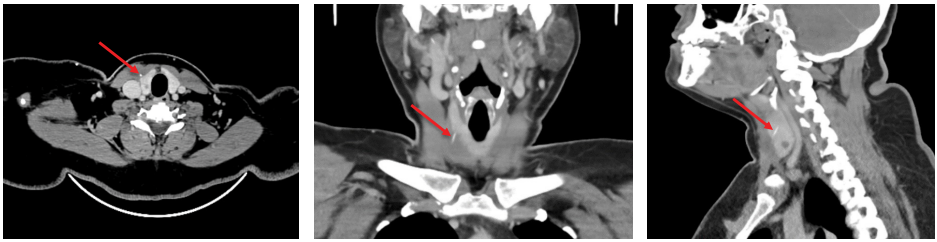
## PRESENTATION

- 48 year old female
- Medical history of Hypothyroidism, on daily medication.
- Suspected foreign body fish bone stuck in the throat with dysphagia 15 days ago that subsided on its own in the next 2 days spontaneously but developed neck pain 10 days later with no associated difficulty in swallowing.
- Laryngopharyngoscopy revealed no obvious foreign body, no swelling, no pooling of saliva. Both vocal cords were mobile equally.
- Sonological examination was done, given neck pain that could not be attributed to other infective causes. It revealed a suspicious linear foreign body and was referred to Aster for further management.

## FINDINGS

### During Examination:

- CT Neck was done to ascertain the exact location of the foreign body - showed linear foreign body embedded in the right thyroid lobe, and just piercing the strap muscle.



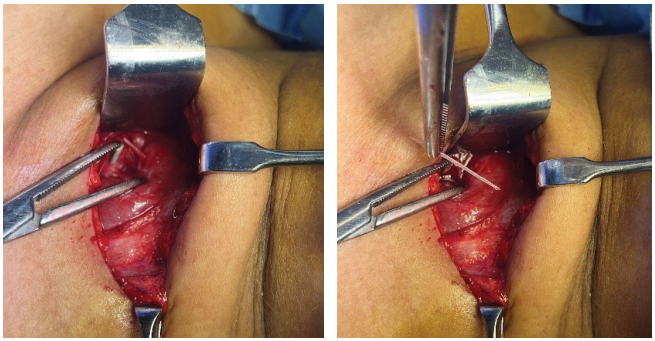
(a) (b) (c)

**CT images showing Fish Bone in (a) Axial, (b) Coronal, and (c) Sagittal Views**

## DURING PROCEDURE

The patient underwent Neck Exploration and Foreign Body Removal through the neck under general anaesthesia:

- After obtaining an informed consent from the patient, the parts were painted and draped under all aseptic conditions.
- The patient was placed in a supine position with her neck extended with a sandbag under the shoulders and a 15-degree head tilt.
- Skin crease incision was made, and upper and lower subplatysmal flaps were raised.
- Strap muscles on the right were retracted, and a 3 cm long fish bone was found embedded in the right thyroid lobe reaching the strap muscles.
- It was removed in toto, and closure was done in layers.



(a) (b)

**Intraoperative view showing (a) the tip of fishbone embedded in the right thyroid lobe, abutting the strap muscle and (b) after extraction in toto after retracting right sternothyoid and sternothyroid muscle**

## POST PROCEDURE

The patient tolerated the procedure well without any complications. She was haemodynamically stable in condition at the time of discharge on post-op day 1.

## DISCUSSION

Fishbone getting stuck in the throat is not an uncommon entity as far as ENT practice is concerned. They present with difficulty in swallowing, pain or drooling immediately. Usual endoscopy guided OPD retrieval or under general anaesthesia in an operation theatre setting is possible once visualised using flexible / rigid scopes and with appropriate instrumentation (2).

However, spontaneous subsidence of symptoms followed by a presentation at a later date with symptoms like neck pain / swelling in the neck / fever with no throat symptoms like pain or difficulty in swallowing - needs further evaluation. Hence, as in our case scenario, eliciting a history of fish ingestion and an episode of it getting stuck in the throat is of utmost importance. A non-contrast CT scan is needed if such patients present with drooling (with an accumulation of saliva in the sinus piriformis on laryngoscopy), fever, worsening/continuing symptoms, and negative endoscopy findings (1). The location and orientation of such migrated ingested foreign bodies and their relation to structures in the neck are essential factors in determining the surgical approach (3). At times, intraoperative fluoroscopy-guided localisation of FB in the soft tissue of the neck might be required (3).

Such migrated sharp foreign bodies can penetrate the major vessels in the neck or facial artery, causing hematomas, remaining as a nidus for recurrent deep neck infections, and parapharyngeal or retropharyngeal abscess (4) or intrathyroidal abscess (5). This warrants the need for immediate neck exploration and FB removal at the earliest.

## REFERENCES

1. Jahshan F, Sela E, Layous E, et al. Clinical criteria for CT scan evaluation of upper digestive tract fishbone. Laryngoscope. 2018 Nov;128(11):2467-2472. Doi: 10.1002/lary.27125.
2. Ballivet-de-Régloix S, Crambert A, Maurin O, et al. Fishbones in the Upper Aerodigestive Tract: A Review of 24 Cases of Adult Patients. Iran J Otorhinolaryngol 2017 Jul;29(93):215-219.
3. Ho N-H, Chang F-C, Wang Y-F. Clinical Approaches to Migrating Ingested Foreign Bodies in the Neck. Ear Nose Throat J 2022 Mar;101(3):181-185. Doi: 10.1177/0145561320948787.
4. Chung S M, Kim H S, Park E H. Migrating pharyngeal foreign bodies: a series of four cases of saw-toothed fish bones. Eur Arch Otorhinolaryngol 2008 Sep;265(9):1125-9. Doi: 10.1007/s00405-007-0572-x.
5. Chen C Y, Peng J P. Esophageal fish bone migration induced thyroid abscess: case report and review of the literature. Am J Otolaryngol 2011 May-Jun;32(3):253-5. Doi: 10.1016/j.amjoto.2010.02.006.

# Insights into Diagnosis and Biologic Interventions for Severe Asthma

**Dr. Sunil Vyas**
Pulmonology (Specialist),
Aster Hospital, Al Qusais & Muhaisnah, Dubai

## INTRODUCTION

Asthma, a prevalent non-communicable disease, is characterized by fluctuating expiratory airflow limitation and persistent airway inflammation (1). This condition impacts over 330 million individuals globally, with severe asthma accounting for 5–10% of this worldwide population, with 3-5% enduring ongoing uncontrolled symptoms despite following recommended treatments and using inhalers as directed (2). The condition is marked by respiratory symptoms such as dyspnea, wheezing, chest tightness, and cough which evolve over-time and vary in intensity (2). Peak expiratory flow rate (PEFR) is a crucial diagnostic and monitoring tool for asthma, revealing diurnal variable airflow obstruction which is indicative of asthma (3). The primary treatment approach involves the chronic use of anti-inflammatory drugs, mainly inhaled corticosteroids, supplemented by bronchodilators, particularly long-acting β 2-agonists (1). In recent decades, a significant breakthrough in severe asthma management has emerged with the introduction of innovative biologic drugs targeting specific disease mechanisms (4). These biologics, focus on key targets such as IgE, interleukin (IL)-5/IL5-receptor, and IL-4/IL-13, which provide a promising approach for enhanced treatment strategies, particularly for individuals with severe and uncontrolled asthma (4).

This article discusses the current biological therapies for severe asthma and their effective management.

## TYPES OF SEVERE ASTHMA:

Severe asthma has been identified into two inflammatory reactions: type 2 (T2)-high expression and T2-low expression, associated with high and low eosinophil levels, respectively (5).

### Type-2 High Asthma:

Type 2-high asthma includes both allergic and nonallergic eosinophilic forms (5). Allergic asthma relies on IgE-dependent processes, while nonallergic asthma is driven by type 2 (T2) cytokine inflammation (5). In this type, inhaled allergens activate mediators like thymic stromal lymphopoietin, IL-25, and IL-33, triggering IL-4, IL-5, and IL-13. The role of IL-5 is crucial for eosinophil functions while both IL-4 and IL-13 facilitate eosinophil entry into tissues (5).

### Type-2 Low Asthma:

T2-low asthma encompasses neutrophilic, paucigranulocytic, or mixed asthma, with less understood pathophysiologies compared to T2-high asthma (5). It activates both T helper (Th) 1 and Th17 cells, with elevated IL-17A mRNA levels in moderate-to-severe asthma patients (5). These individuals are less responsive to corticosteroids, less allergy-prone, and often diagnosed at an older age than other endotypes (5). Despite limited progress in developing treatment drugs for T2-low asthma, no biologics have received approval (5).

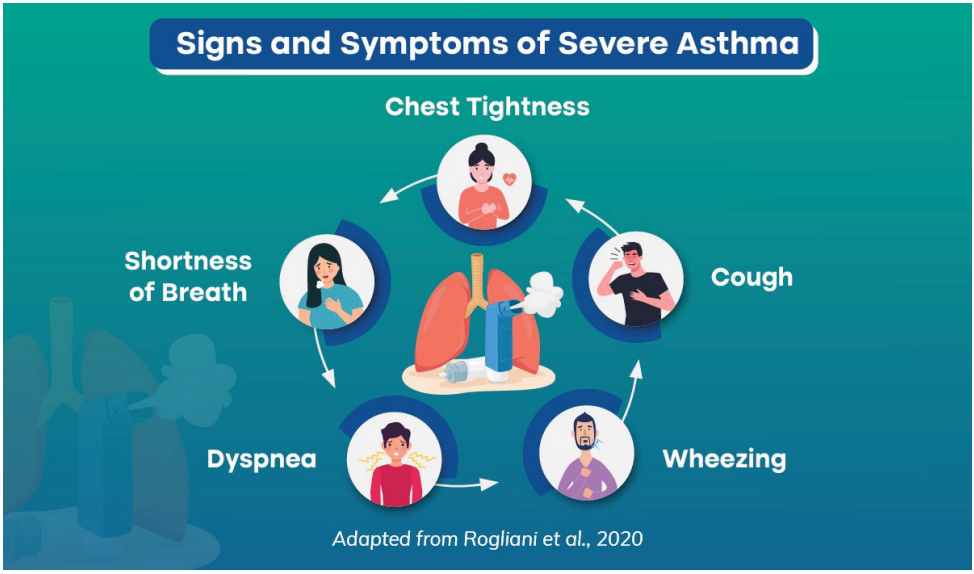



**Figure 1: Signs and Symptoms of Severe Asthma**

## DIAGNOSIS OF SEVERE ASTHMA:

Asthma manifests with cardinal symptoms like dyspnea, wheeze, cough, and chest tightness, often triggered by allergens or viral infections (2). Peak expiratory flow rate is a fundamental yet valuable tool for diagnosing and monitoring asthma, as it demonstrates diurnal variability in airflow obstruction that is indicative of the condition (3). While spirometry is essential for evaluating airway disease, accurate measurement is paramount (3). Pre- and postbronchodilator spirometry can assess reversibility, and an increase in forced expiratory volume indicates asthma (3). Practitioners should exercise caution when interpreting incomplete or non-reproducible results, as this could lead to overdiagnosis or underdiagnosis (3). Comprehensive management, including addressing comorbidities and identifying triggers, is vital for effective asthma control and improving patient outcomes (3).

## BIOLOGICS FOR TREATMENT OF SEVERE ASTHMA:

## BIOLOGICS TARGETING IgE:

Omalizumab is a targeted biologic therapy approved for severe asthma and gained FDA approval in 2003 (4). This recombinant monoclonal antibody binds to IgE, achieving a remarkable reduction of up to 99% in blood IgE levels (4). It is indicated for adults and children aged 6 and above with IgE-driven moderate-to-severe persistent allergic asthma refractory to Global Initiative for Asthma (GINA) step 4/5 treatment, elevated blood IgE, and documented perennial allergen sensitization (4). The dosage of omalizumab is tailored based on body weight and circulating IgE levels (4). In recent years, biomarkers for monitoring the efficacy of omalizumab have emerged, which encompasses total and antigen- specific IgE, blood eosinophil count, and exhaled nitric oxide (FeNO) (4).

## BIOLOGICS TARGETING IL-5:

IL-5 is a crucial regulator influencing eosinophil activation, differentiation, migration, and survival, impacting asthma pathophysiology (4). Biologics targeting IL-5 pathways, including mepolizumab, reslizumab, and benralizumab, are currently approved to address these pathways in asthma management (4).

- **Mepolizumab:**

Mepolizumab, the inaugural anti-IL-5 antibody endorsed for severe asthma, gained FDA approval in 2015 (4). It targets severe eosinophilic asthma unresponsive to GINA step 4/5 therapy (4). Patients are eligible to receive mepolizumab if they have a blood eosinophil count equal to or more than 150 cells per microliter during the initial

administration, or ≥300 cells/µl in the past year, and have experienced at least two asthma exacerbations necessitating systemic steroids over the previous year(4). Administered subcutaneously at a fixed dose, mepolizumab has demonstrated significant reductions in exacerbations, systemic corticosteroid use, emergency room visits, and hospitalizations, coupled with improved asthma control and lung function parameters (4). Studies confirm mepolizumab's positive long-term safety, with no anaphylaxis or parasitic infections reported (4).

- **Reslizumab:**

Reslizumab is a monoclonal antibody that binds tightly to IL-5, effectively reducing circulating blood eosinophil levels (4). It is indicated for severe eosinophilic asthma in patients ≥18 years old unresponsive to high-dose ICS plus another inhaler, it is specifically recommended for patients with ≥400 eosinophils/µl and a history of asthma exacerbations in the past 12 months (4). Reslizumab is administered intravenously and mirrors mepolizumab's positive outcomes, showcasing reduced asthma exacerbations and improved asthma control and lung function parameters (4).

- **Benralizumab:**

Approved in 2017, benralizumab is a monoclonal antibody targeting IL-5 receptor a (IL-5Ra), inducing eosinophil apoptosis through antibody-dependent cell-mediated cytotoxicity (4). It binds strongly to the a-subunit of IL-5Ra expressed on mature eosinophils and basophils (4). It has been approved as an add-on treatment for uncontrolled severe eosinophilic asthma in patients who are 18 years of age or older with ≥300 blood eosinophils/µl (4). Benralizumab is administered subcutaneously, and studies demonstrate decreased exacerbations, improved lung function, and reduced oral corticosteroid use (4). The predictors of response include adult-onset asthma, more than three exacerbations in the previous year, nasal polyposis, and pre-bronchodilator FVC < 65% of predicted (4).

Biologics targeting IL-4 and IL-13:

IL-4 and IL-13, pivotal regulators of Type-2 inflammation, enhance Th-2 cell population, B-cell IgE rearrangement, and eosinophilic transmigration (IL-4) (4). IL-13 contributes to asthma by inducing airway hyperresponsiveness, mucus secretion, and remodeling (4). Dupilumab is the sole licensed drug targeting these interleukins and was approved in 2018 (4). It binds to the IL-4 receptor alpha-subunit, inhibiting IL-4 and IL-13 pathways (4). It is licensed for asthmatic patients aged ≥12 years with Type 2 inflammation, and is administered subcutaneously (4). Dupilumab is also indicated for atopic dermatitis and nasal polyposis (4). Studies show it reduces asthma exacerbations, improves lung function, and asthma control test scores, regardless of

eosinophil count (4). The Liberty Asthma Venture Trial assessed the oral corticosteroid (OCS)-sparing effect of dupilumab (6). During this trial, a temporary increase in blood eosinophilia was observed at the beginning which may be due to inhibited migration into tissues rather than increased production (4,6). The study also found that individuals with higher initial blood eosinophil counts and FeNO levels experienced more prominent improvements (6).

## BIOLOGICS UNDER DEVELOPMENT:

Ongoing research in next-generation biologics is targeting novel effector molecules, particularly alarmins, released by the airway epithelium in response to various harmful stimuli (4). Tezepelumab, a human monoclonal antibody binding to thymic stromal lymphopoietin (TSLP), a key alarmin in asthma pathogenesis (4). It effectively reduces exacerbations, improves lung function, and enhances asthma control and quality of life without notable safety concerns (4). Monoclonal antibodies Tralokinumab and Lebrokizumab, targeting IL-13, yielded disappointing results in phase 3 trials for severe asthma management (4). Efforts also extend to Th2-low asthma, characterized by neutrophilic airway inflammation, focusing on cytokines like IL-1beta, IL-17, and IL-23 (4). Monoclonal antibodies such as canakinumab, brodalumab, and risankizumab targeting these interleukins are under evaluation, with phase 1–2 trials showing mixed outcomes (4). Further research is needed to elucidate their potential in managing Th2-low asthma (4).

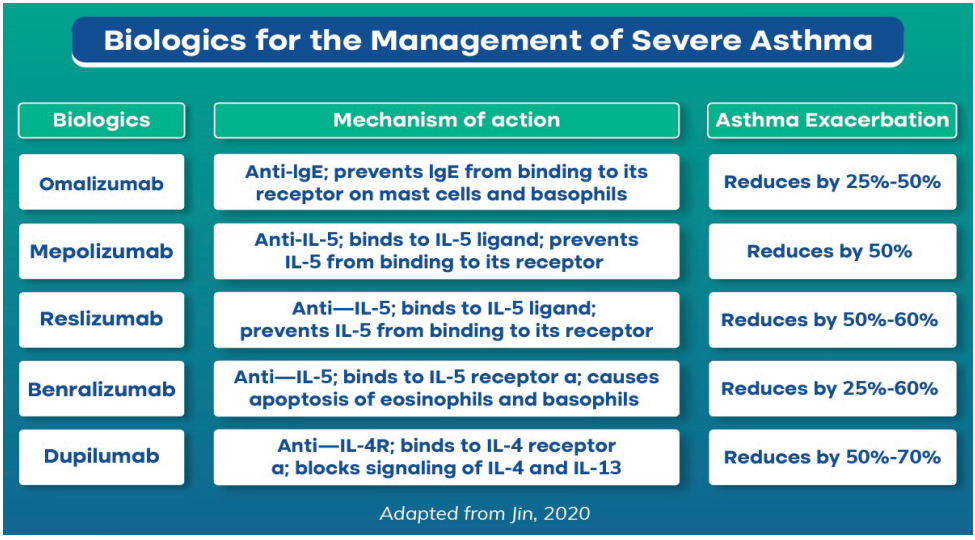



**Figure 2: Biologics for the Management of Severe Asthma**

## WHAT BIOLOGIC MEDICATION WOULD BE MOST SUITABLE FOR ASTHMATIC PATIENT?

When selecting a biologic for severe uncontrolled asthma, consider asthma endotype, biomarkers, and patient preferences (4). Omalizumab suits allergic non-eosinophilic cases with high IgE and documented perennial allergen sensitivity (4). Patients with non-allergic eosinophilic asthma should receive treatment with an anti-IL-5 biologic drug (4). Severe eosinophilic type 2 asthma with OCS dependency may require anti-IL-4/IL-13 (4). According to GINA, a 4-month trial assesses should be carried to evaluate asthma control, allowing biologic switching if needed (4). However, the optimal timing and method for switching remain unclear (4).

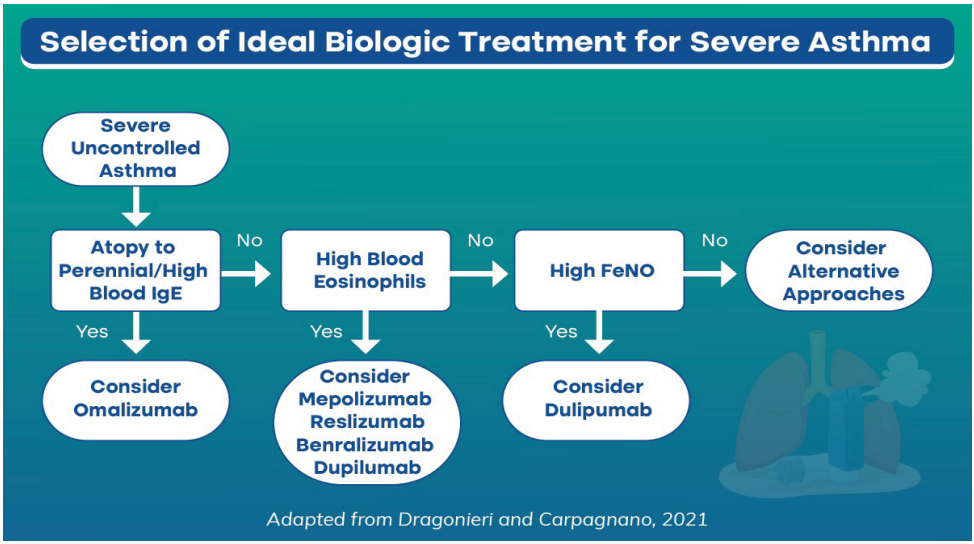



**Figure 3: Selection of Ideal Biologic Treatment for Severe Asthma**

## Key Highlights

- Severe asthma is marked by variable airflow limitation and persistent airway inflammation, which leads to increased mortality and reduced quality of life (2).
- Peak expiratory flow rate (PEFR) serves as a diagnostic tool for asthma, indicating the condition's presence and overall control through diurnal variability (3).
- Innovative biologics targeting IgE, IL-5, and IL-4/IL-13 have revolutionized severe asthma management, offering hope for those with uncontrolled symptoms (4).
- Continued research on next-gen biologics and novel targets is vital to enhance severe asthma treatment and address ongoing challenges in care (4).

## REFERENCES

1. Paoletti G, Pepys J, Casini M, Bona DD, Heffler E, Goh CYY, et al. Biologics in severe asthma: the role of real-world evidence from registries. European Respiratory Review [Internet]. 2022 Jun 30 [cited 2024 Feb 7];31(164). Available from: https://err.ersjournals.com/content/31/164/210278
2. Rogliani P, Calzetta L, Matera MG, Laitano R, Ritondo BL, Hanania NA, et al. Severe Asthma and Biological Therapy: When, Which, and for Whom. Pulm Ther. 2020 Jun 1;6(1):47–66.
3. Jones TL, Neville DM, Chauhan AJ. Diagnosis and treatment of severe asthma: a phenotype-based approach. Clinical Medicine. 2018 Apr 1;18(Suppl 2):s36–40.
4. Dragonieri S, Carpagnano GE. Biological therapy for severe asthma. asthma res and pract. 2021 Dec;7(1):1–8.
5. Jin HJ. Biological treatments for severe asthma. Yeungnam University Journal of Medicine. 2020 Oct;37(4):262.
6. Huang J, Pansare M. New Treatments for Asthma. Pediatric Clinics of North America. 2019 Oct;66(5):925–39.

# Minimally Invasive Procedure of Non-Surgical Rhinoplasty using Threads conducted successfully at Aster Clinic, Al Khail Mall, Dubai

**Dr. Dalton Singh Kanwar**
Dermatology / Cosmetology (Specialist)

## PRESENTATION

- 28 year old female
- The patient presented with concern about the depression of the nasal bridge. She was looking for non-surgical options to improve it.
- Otherwise, a healthy individual with no past or present significant medical history.

## FINDINGS

### During Examination:

- Vitals were normal.
- Nose was seen well in proportion to the face. There was a mild depression on the bridge of the nose, which was medically insignificant, but she wanted to improve her profile view aesthetically.

## TREATMENT PLAN

- Non-surgical treatment options were discussed with the patient. She did not prefer Filler due to the chances of vascular complications. Threads option was preferred as there was no risk of vascular embolism and ophthalmological complications.
- Taking aseptic precautions, the full face was cleansed with alcohol and betadine solution.
- Local infiltrative anaesthesia was given on the tip of the nose, columella, and dorsum of the nose with 2% lidocaine.
- 360D barbed cog PDO thread with an L-shaped blunt 21G 90 mm cannula with flexible, high-quality medical steel was used, as shown in Figure 1.

- The Cannula was inserted from point A, which was then travelled in the columella towards the nasal spine (point B); it was rotated there to fix the adjacent tissue, then it was taken back towards point A (the entry point), where without removing the cannula out from the point A, Cannula was rotated to travel through dorsum of nose and reach point D.
- The cannula was rotated again to fix the thread to adjacent tissue, and then the cannula was taken back and removed from point A, which was also the exit point.
- Any external thread was cut close to the skin, so the entry/exit site does not have a visible thread.

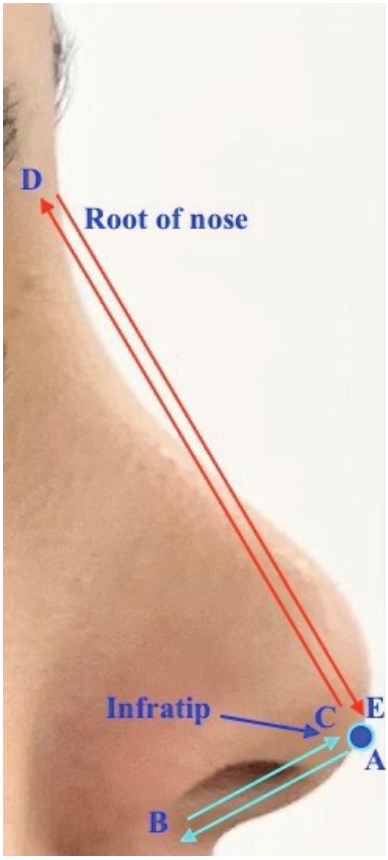



**Figure 1. Treatment plan with barbed thread. The thread's entry (A), exit (E) points, and point C at the infra-tip are the same. The thread's path is ABCDE. D is the Root of the nose.**

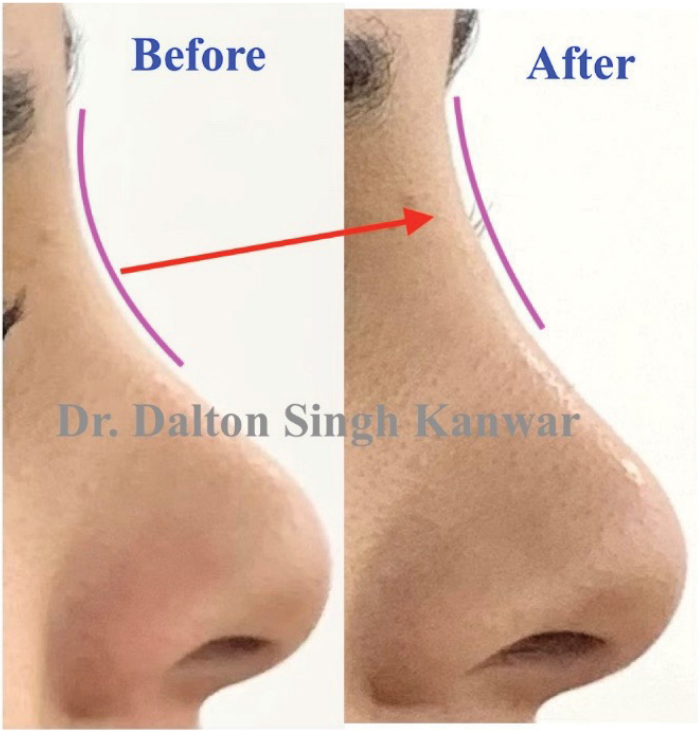



**Figure 2. Improvement in the profile view of the nose with threads**

## DISCUSSION

Cosmetic correction of the nose is highly sought after the procedure. Since the availability of non-surgical methods for improvement in the appearance of the nose, it is more often demanded by the patients due to quickness, cheaper cost, limited to no downtime, and no general anaesthesia (1). These options include injection of fillers, threads, and fat. Although there are limitations in non-surgical methods, the results may last 6 months to 18 months, depending on the method used. Fillers last for around 12-18 months, and threads last for around 6 months. Repeated treatment, with the resulting collagen production and fibrosis, leads to longer lasting results. Nonsurgical rhinoplasty provides an alternative for minor cosmetic nose correction to avoid increased complexity and risk associated with revision surgical rhinoplasty (2).

Rare but severe complications like tissue necrosis, stroke, and blindness have been reported with dermal fillers (3,4). Threads used with cannula have fewer vascular

complications like bruises and no risk of embolism leading to blindness.

PDO threads are made of a synthetic biodegradable polymer that has been used for many years in surgery for wound closure and facial thread lifting (5,6). They are absorbed by a hydrolysis process that stimulates fibroblasts and promotes collagen formation around the thread (5,6).

Studies have demonstrated an increase in collagen type 1 and 3, TGF-b 1, b2, and b3 two weeks after PDO thread injection, with the collagen-producing effects of PDO threads lasting more than 48 weeks (7-9). According to Wong, collagen production around the thread helps restore volume and improve skin elasticity and texture (6). PDO threads produce physical augmentation by initially providing a rigid framework (8) and subsequently cause mild local oedema, lymphocytic infiltrate, and fibrosis (10,11).

## REFERENCES

1. Mehta U, Fridirici Z. Advanced techniques in nonsurgical rhinoplasty. Facial Plast Surg Clin North Am. 365-355:(3)27;2019. doi:10.1016/j.fsc.2019.04.008
2. Humphrey CD, Arkins JP, Dayan SH. Soft tissue fillers in the nose. Aesthetic Surg J. 484-29:477;2009. doi:10.1016/j.asj.2009.09.002
3. Goodman GJ, Roberts S, Callan P. Experience and Management of Intravascular Injection with facial fillers: results of a multinational survey of experienced injectors. Aesthetic Plast Surg. 40:549;2016-555. doi:10.1007/s1-0658-016-00266
4. Dayan SH. Complications from Toxins and Fillers in the Dermatology Clinic Recognition, Prevention, and Treatment. Facial Plast Surg Clin North Am. 673-663:(4)21;2013. doi:10.1016/j.fsc.2013.07.008
5. Kang SH, Moon SH, Il RB, Youn SJ, Kim HS. Wedge-shaped polydioxanone threads in a folded configuration ('solid fillers"): a treatment option for deep static wrinkles on the upper face. J Cosmet Dermatol. 70-18:65;2019. doi:10.1111/jocd.12557
6. Wong V. Hanging by a thread: choosing the right thread for the right patient. J Dermatology Cosmetol. 88-1:86;2017. doi:10.15406/ jdc.2017.01.00021
7. Kim J, Zheng Z, Kim H, Nam KA, Chung KY. Investigation on the cutaneous change induced by face-lifting monodirectional barbed polydioxanone thread. Dermatologic Surg. 80-43:74;2017. doi:10.1097/DSS.0000000000000925
8. Kim CM, Kim BY, Hye Suh D, Lee SJ, Moon HR, Ryu HJ. The efficacy of powdered polydiox anone in terms of collagen production compared with poly-L-lactic acid in a murine model. J Cosmet Dermatol. 1898-18:1893;2019. doi:10.1111/jocd.12894
9. Yoon JH, Kim SS, Oh SM, Kim BC, Jung W. Tissue changes over time after polydioxanone thread insertion: an animal study with pigs. J Cosmet Dermatol. 891-18:885;2019. doi:10.1111/jocd.12718
10. Conley J, Baker DC. Thread Augmentation. Arch Otolaryngol. 669-666:(11)105 ;1979. doi:10.1001/archotol. 1979.00790230036008
11. Jang HJ, Lee WS, Hwang K, Park JH, Kim DJ. Effect of cog threads under rat skin. Dermato logic Surg. 1644-31:1639;2005.doi:00001-200512000-00042728/10.1097

# Understanding the Relationship between Thyroid and Obesity and its Clinical Implications

**Dr. Abhilash Jayachandran**
General Surgery (Specialist),
Aster Hospital, Sharjah

## INTRODUCTION

The association between Thyroid hormones (TH) and body composition appears to be closely interlinked (1). TH controls basal metabolism, and thermogenesis and is essential for managing lipid and glucose metabolism, food intake, and fat breakdown (1). Disturbances in thyroid function have implications for changes in body weight and composition, as well as total and resting energy expenditure (REE), irrespective of physical activity levels (2). They also influence processes such as gluconeogenesis while maintaining a balance in energy levels, as demonstrated by observed changes in patients with thyroid dysfunctions, including hyperthyroidism and hypothyroidism (3). These changes extend beyond physiological functions to significant alterations impacting body weight and composition (1).

This article will discuss in detail the intriguing relationship between obesity and thyroid and the consequent clinical implications.

## OBESITY-RELATED CHANGES IN THYROID FUNCTION AND STRUCTURE

Most overweight people without a diagnosed thyroid condition typically have normal thyroid function (4). However, obese individuals are more likely to experience overt hypothyroidism and subclinical hypothyroidism, with rates estimated at 14.0% and 14.6%, respectively, compared to those with a normal body weight (4).

The mechanism behind obesity-related changes in thyroid hormone levels is complex (4). On one hand, the increase in TSH level in obese individuals may be due to central resistance to locally produced triiodothyronine (T3) as an adaptive process aimed at increasing basal energy expenditure (4). On the other hand, increased TSH levels in obesity are associated with an excess of leptin that directly stimulates thyroid releasing hormone (TRH) and TSH secretion (4). Furthermore, leptin has been found to

activate deiodinases, enzymes responsible for converting free thyroxine (fT4) to free T3 (fT3), which is believed to be another mechanism aiming at boosting basal metabolic rate (BMR) and energy expenditure (4).

Due to the possibility that elevated TSH level serves as an adaptation of the central axis to obesity-related metabolic changes meant to enhance energy expenditure and prevent further weight gain, it has been proposed that hyperthyrotropinemia is a more fitting term than subclinical hypothyroidism under these circumstances (4).

Both American Thyroid Association (ATA) and the European society of endocrinology (ESE) suggest screening obese individuals for thyroid dysfunction by measuring TSH (5). A normal TSH level can help rule out primary hypothyroidism as a cause of secondary obesity, but it is important to note that a low TSH level in an obese person may indicate pituitary-hypothalamic dysfunction (which accounts for less than 1% of hypothyroidism cases) (5). Therefore, guidelines recommend testing fT4 only if TSH is high or if conditions other than primary hypothyroidism are suspected (5). It is not advised to routinely measure fT3 in obese individuals with elevated TSH levels (5). If the levels of TSH and fT4 in an obese patient indicate subclinical hypothyroidism, then screening tests for autoimmune thyroid disorder (AITD) should be conducted (5). In this scenario, determining thyroid antibodies can help diagnose AITD and identify individuals at risk of developing overt hypothyroidism (5). The guidelines therefore recommend evaluating thyroid peroxidase antibodies and suggest that a level >500 IU/ml indicates a high risk of progression(5).

Recommendations for testing for thyroid dysfunction in obese patients is summarized in Figure 1.

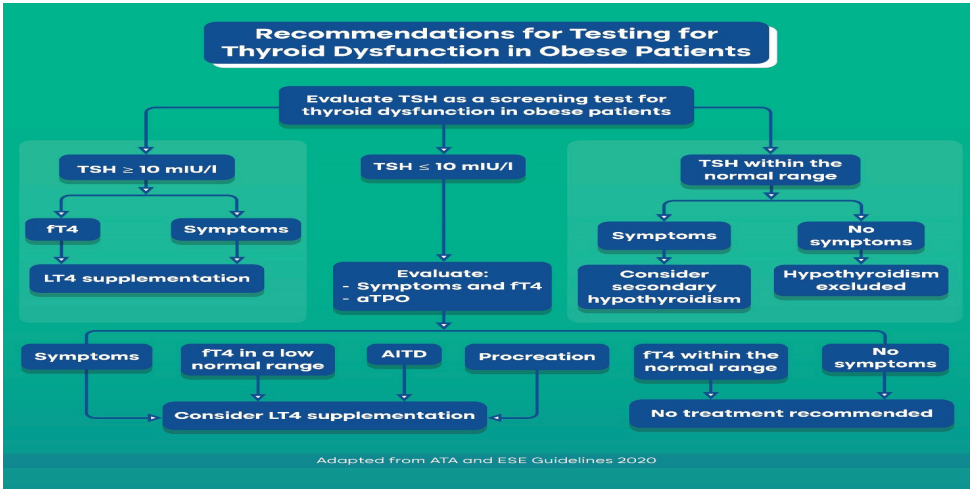



**Figure 1: Guideline Recommendations for Assessing Thyroid Function in Individuals with Obesity**

## HYPOTHYROIDISM AND OBESITY

Hypothyroidism is linked to reduced thermogenesis and metabolic rate, as well as a higher body mass index and increased likelihood of obesity (1). Additionally, the retention of water due to an increase in hyaluronic acid and reduced renal flow along with impaired peristalsis leading to long-term constipation can contribute to weight gain (1). Research indicates that even mild thyroid dysfunction, such as subclinical hypothyroidism, is associated with significant changes in body weight and poses a risk for overweight and obesity (6). Overt hypothyroidism has been found to result in varying degrees of weight gain, affecting 54% of patients with overt hypothyroidism, yet the extent of weight gain tends to be limited (6). The changes in body weight related to hypothyroidism may stem from an accumulation of body fat due to decreased resting energy expenditure and lower physical activity levels (6). Hypothyroid patients also demonstrate elevated levels of glycosaminoglycans responsible for greater water retention capacity, which leads to the characteristic 'myxedema' appearance associated with this condition (6). From a clinical viewpoint, both obesity and mild thyroid failure are prevalent conditions that often coexist (6). A study revealed that among obese individuals, 33% had overt hypothyroidism while 11% had subclinical hypothyroidism; further indicating that obesity was more frequently observed alongside overt rather than subclinical forms of the condition (7).

The ESE guidelines suggests regular screening for hypothyroidism in obese patients as it can lead to an unfavorable lipid profile, increasing the risk of cardiovascular issues and metabolic syndrome (5). Importantly, untreated hypothyroidism can reduce the effectiveness of weight loss treatments (5).

## HYPERTHYROIDISM AND OBESITY

Hyperthyroidism commonly leads to weight loss, although around 10% of patients with hyperthyroidism may experience weight gain (8). Although the exact mechanism is not fully understood, it is generally believed that transitioning from hyper- to euthyroid status can promote obesity in susceptible individuals (8).

Several studies have shown that the treatment of hyperthyroidism can lead to excessive weight regain (9). After thyroidectomy for hyperthyroidism, there is a statistically and clinically significant excessive weight gain, which has been linked to deficient replacement therapy with L-T4 and an imbalance of thyroid hormone homeostasis due to poor tissue conversion of T4 to T3 (10). Additionally, radioiodine therapy is also associated with significant weight gain, with an average of 5-6 kg over one-year post-treatment (11). This weight gain may persist for up to 5 years and lead to excess body weight compared to the premorbid condition similar to what is observed in Graves' patients after total thyroidectomy (11). Treatment with anti-thyroid drugs

(ATD) has also been linked with a 2-4 kg increase in weight starting at the beginning of treatment and potentially lasting for one year following its completion (12). While these effects are seen both in treatments using ATDs alone as well as block-and-replace therapy regimens, a direct comparison between them is lacking (12).

## THYROID CANCER AND OBESITY

Obesity is associated with a state of low-grade chronic inflammation, leading to increased levels of inflammatory factors and the production of various cytokines and adipokines (13). These components have the potential to influence cell proliferation and promote tumor development in different tissues, including the thyroid gland directly or indirectly (13).

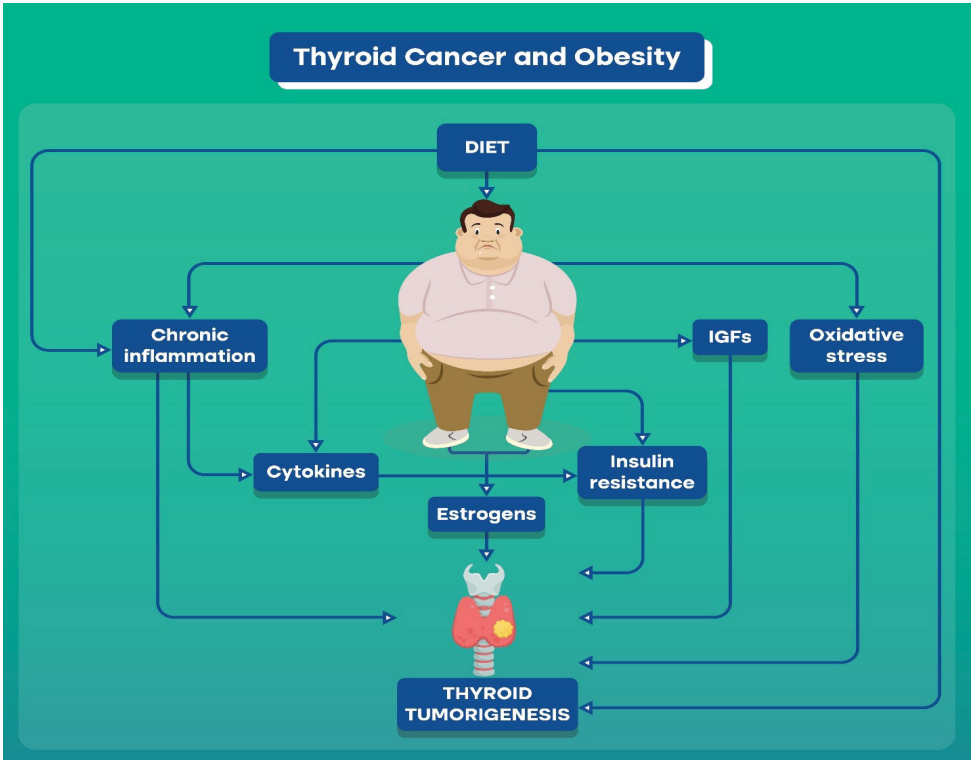



**Figure 2: The Relationship between Thyroid Cancer and Obesity**

In recent years, there has been extensive research into the relationship between obesity and TC (13). Studies indicate that a five-point increase in BMI and a 0.1-point rise in waist-to-hip ratio can increase the likelihood of TC by 30% and 14% respectively

(14). Furthermore, researchers have explored potential contributing factors associated with TC such as low-grade chronic inflammation, adipokines, disruption of growth signaling pathways, chronic hyperinsulinemia, estrogens, modified immune response, and DNA damage caused by oxidative stress(13).

## DOES WEIGHTLOSS HAVE AN EFFECT ON THYROID FUNCTION AND DISORDERS?

Weight reduction can be accomplished through lifestyle changes, medication treatment, surgical procedures for obesity, or a combination of these approaches (15). Research focusing on lifestyle modifications (such as diet and increased physical activity) found that a decrease in fat mass was linked to a drop in TSH level (from an average of 2.8 mU/L to 2.2 mU/L) (16). This intervention also led to a significant decrease in the number of individuals with elevated TSH levels from 17.2% to 6.2% (16). Evidence suggests that bariatric surgery leads to normalization of TSH levels in nearly all patients regardless of the specific procedure used; one study illustrated an average reduction in TSH level from 4.5 U/mL to 1.9 U/mL post-surgery (gastric bypass or adjustable gastric banding), with complete normalization observed among patients previously diagnosed with subclinical hypothyroidism before the procedure (~10% of subjects) (15). However, fT4 levels were not influenced by BMI and remained unaffected by bariatric surgery (15).

Similarly positive outcomes were reported by Moraes et al., where all patients identified with subclinical hypothyroidism pre-surgery experienced normalized TSH after Roux-en-Y gastric bypass (15). Other studies indicated up to a 90% rate of obese individuals achieving normalized TSH levels following laparoscopic sleeve gastrectomy, suggesting that obesity-related hyperthyrotropinemia is reversible upon weight loss (15). A study involving ten patients assessed how bariatric surgery impacted thyroid ultrasound results (15). The findings indicated that losing weight was linked to higher levels of thyroid echogenicity, suggesting a possible reversal of obesity-related structural changes with weight loss (15)

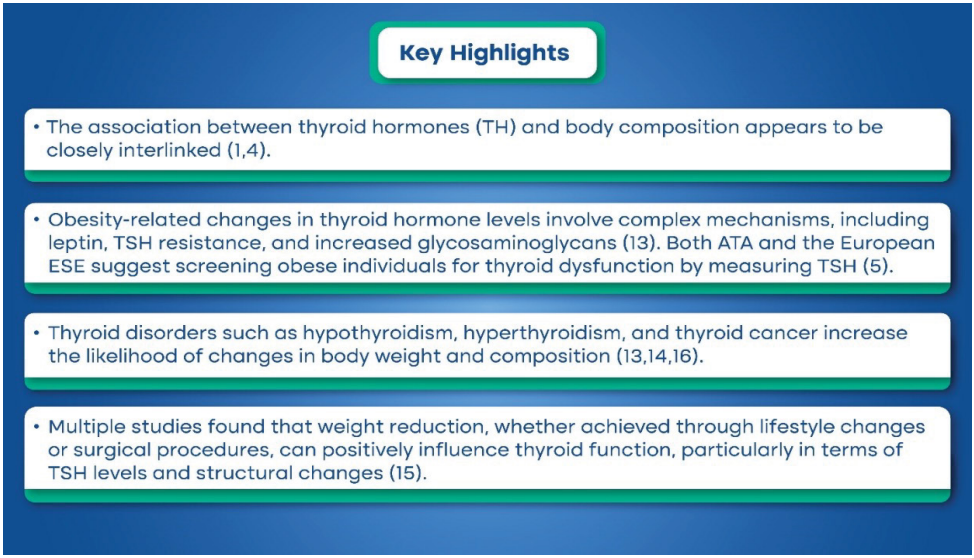
## OBESITY- A CAUSE OR CONSEQUENCE OF THYROID DISORDERS

Based on research studying the associations between thyroid function and BMI, two scenarios are supported (3). In the first scenario, hypothyroidism serves as the initial event, causing a decrease in basal metabolic expenditure and resulting in a positive energy balance leading to weight gain (3).

In the second scenario, obesity is associated with variations in TH circulating levels and

adiposity (3). The excess adipose tissue prompts an increase in TH levels, mediated by heightened secretion of thyroid-stimulating hormone (TSH) due to elevated leptin concentrations from adipocytes (3). Continued adipose tissue maintenance leads to metainflammation, causing hypothalamic inflammation, alterations in thyrotropin-releasing hormone (TRH) and TSH secretion, and interference with leptin signaling (3). This ultimately results in reduced circulating TH levels (3). In this scenario, the reduction in TH levels may be attributed to metabolic inflammation, autoimmune events against TH synthesis enzymes, or a combination of both (3).

Both scenarios converge when reduced TH levels promote a positive energy balance in obesity (3). Varied results in TSH or TH determinations in obese patients may be attributed to differences in the severity and duration of obesity, reflecting the varying degrees of hypothalamic inflammation or autoimmunity influencing thyroid function (3).




## REFERENCES

1. Sanyal D, Raychaudhuri M. Hypothyroidism and obesity: An intriguing link. Indian Journal of Endocrinology and Metabolism. 2016 Aug;20(4):554.
2. Cordido M, Juiz-Valiña P, Urones P, Sangiao-Alvarellos S, Cordido F. Thyroid Function Alteration in Obesity and the Effect of Bariatric Surgery. Journal of Clinical Medicine [Internet]. 2022 Mar [cited 2024 Mar 4];11(5). Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8911439/
3. García-Solís P, García OP, Hernández-Puga G, Sánchez-Tusie AA, Sáenz-Luna CE, Hernández-Montiel HL, et al. Thyroid hormones and obesity: a known but poorly understood relationship. Endokrynologia Polska. 2018;69(3):292–303.

4. Kurylowicz A. Endocrine Disorders Accompanying Obesity - Effect or Cause? In: Role of Obesity in Human Health and Disease [Internet]. IntechOpen; 2021 [cited 2024 Mar 4]. Available from: https://www.intechopen.com/chapters/77401
5. ESE Clinical Practice Guideline: Endocrine work-up in obesity | ESE [Internet]. [cited 2024 Mar 4]. Available from: https://www.ese-hormones.org/publications/directory/ese-clinical-practice-guideline- endocrine-work-up-in-obesity/
6. Sr J. Thyro-weight: Unlocking the Link between Thyroid Disorders and Weight. The Journal of the Association of Physicians of India [Internet]. 2018 Mar [cited 2024 Mar 4];66(3). Available from: https://pubmed.ncbi.nlm.nih.gov/30341874/
7. Abhyuday V, Muthukrishnan J, Hari KVS K, Kirtikumar d M. Hypothyroidism and obesity. Cause or effect? Saudi Med J. 2008 Aug 1;29(8):1135–8.
8. Kyriacou A, Kyriacou A, Makris KC, Syed AA, Perros P. Weight gain following treatment of hyperthyroidism-A forgotten tale. Clinical Obesity. 2019 Oct 1;9(5):e12328.
9. Moli RL, Vella V, Tumino D, Piticchio T, Naselli A, Belfiore A, et al. Inflammasome activation as a link between obesity and thyroid disorders: Implications for an integrated clinical management. Frontiers in Endocrinology [Internet]. 2022 [cited 2024 Mar 4];13. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9437482/
10. B T, L N, Ma M, C M, K B. Patients Treated for Hyperthyroidism Are at Increased Risk of Becoming Obese: Findings from a Large Prospective Secondary Care Cohort. Thyroid : official journal of the American Thyroid Association [Internet]. 2019 Oct [cited 2024 Mar 4];29(10). Available from: https://pubmed.ncbi.nlm.nih.gov/31375059/
11. Yotsapon T, Waralee C, Hussamon P, Panita S, Siriwan B, Soontaree N, et al. Duration of antithyroid drug treatment may predict weight gain after radioactive iodine therapy in patients with Graves' disease. Heliyon [Internet]. 2022 May [cited 2024 Mar 4];8(5). Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9124706/
12. Klieverik LP, Kalsbeek A, Ackermans MT, Sauerwein HP, Wiersinga WM, Fliers E. Energy Homeostasis and Body Weight before and after Cessation of Block and Replacement Therapy in Euthyroid Patients with Graves' Disease. International Journal of Endocrinology [Internet]. 2011 [cited 2024 Mar 4];2011. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3235466/
13. Franchini F, Palatucci G, Colao A, Ungaro P, Macchia PE, Nettore IC. Obesity and Thyroid Cancer Risk: An Update. International Journal of Environmental Research and Public Health [Internet]. 2022 Feb [cited 2024 Mar 4];19(3). Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8834607/
14. Schmid D, Ricci C, Behrens G, Leitzmann MF. Adiposity and risk of thyroid cancer: a systematic review and meta-analysis. Obesity Reviews. 2015 Dec 1;16(12):1042–54.
15. Gajda SN, Kuryłowicz A, Żach M, Bednarczuk T, Wyleżoł M. Diagnosis and treatment of thyroid disorders in obese patients — what do we know? Endokrynologia Polska. 2019;70(3):271–6.
16. Radetti G, Longhi S, Baiocchi M, Cassar W, Buzi F. Changes in lifestyle improve body composition, thyroid function, and structure in obese children. J Endocrinol Invest. 2012 Mar 1;35(3):281–5.

**Dr. Aneesha Fathima T S**
General & Laparoscopic Surgery (Specialist)
Aster Hospital, Muhaisnah

**Dr Pradeep Chand S Nair**
Cardio-Thoracic Surgery (Specialist)
Aster Hospital, Al Qusais

# An Interesting Case of Multinodular Colloid Goitre with Retrosternal Extension treated successfully with Thyroidectomy at Aster Hospital, Muhaisnah

## PRESENTATION

- 29 year old female
- Swelling in the front of the neck for 8 months; took Thyroxin for 2 months and discontinued when TFT (Thyroid Function Tests) levels became normal
- Referred by Endocrinologist as a case of MNG (Multinodular Goitre) extending into the superior mediastinum (Right side: 3.7 x 1.9 cm; Left side: 3 x 2.8 cm) with increasing vascularity
- No family history of medical illness
- Admitted with:
  - Same symptoms of swelling in the neck with signs of colloid nodule
  - Increasing constantly in size with difficulty in swallowing

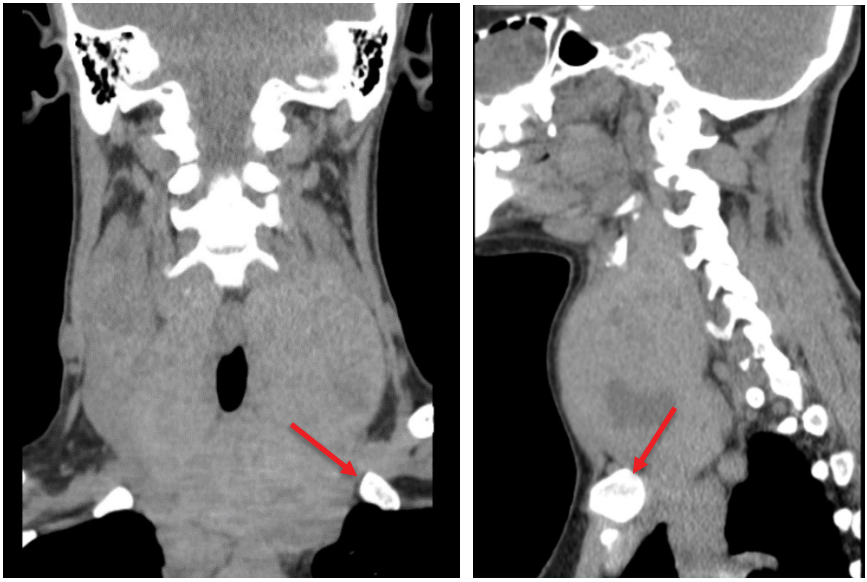
## FINDINGS

### During Examination:

- Swelling in front of the neck (10 x 15 cm size), moving with deglutition
- Multiple nodules+ (Left > Right)
- Lower border not palpable
- No e/o thoracic inlet obstruction
- Multinodular goitre.

**CECT of the neck showed:**

- Diffuse symmetric enlargement of thyroid lobe measuring 11 x 9 x 4.4 cm (TR x CC x AP). The lower central aspect showed a nodule with 10 x 10 mm microcalcification. Circumferential mass effect on the upper trachea noted. The trachea was central.
- Lesion showed retrosternal extension in the anterior mediastinum. The lower limit of the lesion was seen at 1.7 cm below the sternal notch. The lower end was noted resting on the left brachiocephalic vein. The intervening fat planes appeared well preserved. The right brachiocephalic artery was seen along the posteroinferior aspect of the mass. Posterior mediastinum appeared normal.
- The contents of the carotid space were displaced postero-laterally.



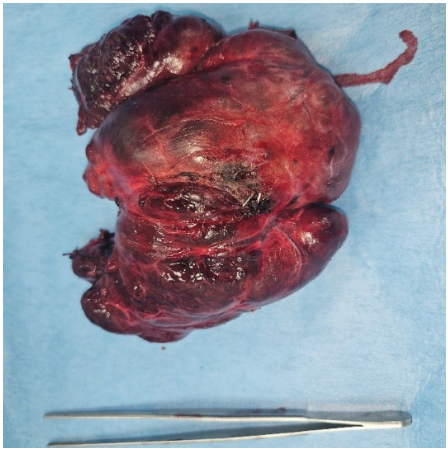
**CT neck in Coronal and Sagittal views showing Retrosternal Extension**

## DURING PROCEDURE

After a pre-anaesthetic checkup and ENT consultation for vocal cord assessment, the patient underwent Total Thyroidectomy under GA. The cardiothoracic surgery department was also informed and was assured of any intra-op assistance.

- After obtaining informed consent from the patient, the parts were painted and draped under aseptic conditions.

- The patient was placed in a supine position, and the neck was extended with a sandbag under the shoulders and a 15° head tilt.
- Skin crease incision was made, and upper and lower subplatysmal flaps were raised.
- Deep fascia was opened longitudinally in the midline.
- Strap muscles were incised in the upper one-third, and the middle thyroid vein was ligated.
- Upper pole was mobilized, and the superior thyroid artery and vein in the space of Reeves were ligated and cut.
- External laryngeal nerve was identified and secured.
- The inferior thyroid artery was dissected in branches. The branches of parathyroids were secured on both sides. Capsular dissection was done, saving the superior and inferior parathyroid.
- The recurrent laryngeal was identified.
- Lower pole was mobilized. The left lower lobe had a retrosternal component, but there was a clear fat plane separating from major vessels, hence delivered with dissection.
- Left lobe was separated from the trachea and removed along with the isthmus. Similarly, the right lobe was also excised.
- After achieving complete hemostasis, an incision was closed in layers after placing a suction drain.



**Post-op image showing the specimen total thyroidectomy of 11 x 9 x 4.4 cm size**

## POST PROCEDURE

The patient tolerated the procedure well without any complications. She was stable in condition, and the post-operative period remained uneventful. The patient had no hoarseness of voice, hypocalcemia, or haemorrhage.

The drain was removed on post-op discharge (POD) day 1, and she was asked to be on an oral diet on discharge.

**Post-op visit:** There were no complaints of hypocalcemia or wound-related complaints. No significant change in voice was noted. The patient is on thyroid replacement.

## DISCUSSION

RSG is a slow-growing mass, which often remains asymptomatic (20–40%) for a longer duration and is diagnosed accidentally during the radiographic investigation.

The preoperative imaging for RSG mainly includes chest radiography, thyroid ultrasonography, and scintigraphy. Notably, ultrasonography is readily available, has low exposure risk, and guides FNAC, but it could be more beneficial for the preoperative evaluation for the retrosternal extension. Moreover, a CT scan is considered the most reasonable modality to assess the extent of the goitre as it provides detailed anatomic features of the thyroid gland, trachea, and oesophagus. In the present study, FNAC has been performed.

During surgery, a surgeon should always anticipate a need for sternotomy, and the thoracic surgeons should be consulted beforehand.

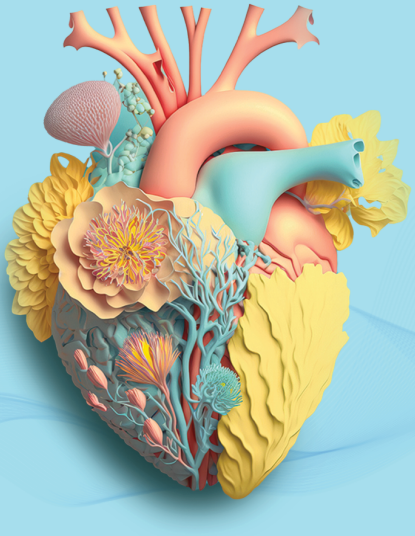
Hypoparathyroidism and recurrent laryngeal nerve injury are frequent postoperative complications. Patients who underwent thyroidectomy for RSG were more likely to develop transient hypoparathyroidism as compared with those who had a standard thyroidectomy.

## REFERENCES

1. Sahsamanis G, Chouliaras E, Katis K, Samaras S, Daliakopoulos S, Dimitrakopoulos G. Patient-tailored management of an asymptomatic massive substernal goiter presenting as brachiocephalic vein occlusion. Report of a case and review of sternotomy indications. Int J Surg Case Rep. 2017;31:35–38.
2. Rugiu MG, Piemonte M. Surgical approach to retrosternal goitre: do we still need sternotomy? Acta Otorhinolaryngol Ital. 2009;29(6):331–338.
3. White ML, Doherty GM, Gauger PG (2008) Evidence-based surgical management of substernal goiter. World J Surg 32(7):1285–1300
4. Delbridge L (2003) Total thyroidectomy: the evolution of surgical technique. ANZ J Surg 73(9):761–768
5. Page C, Strunski V (2007) Cervicothoracic goitre: an anatomical or radiological definition? Report of 223 surgical cases. J Laryngol Otol 121(11):1083–1087
6. Huins CT, Georgalas C, Mehrzad H, Tolley NS (2008) A new classification system for retrosternal goitre based on a systematic review of its complications and management. Int J Surg 6(1):71–76

Aster
HOSPITAL
We'll Treat You Well

Introducing
# Advanced Heart Clinic
Reviving Hearts, Renewing Lives



## Get to the heart of the problem with our #ExpertsAtHeart

**The Advanced Heart Clinic at Aster Hospitals offer expert cardiac care, extending lifespan & improving quality of life.**

- Self-Management Strategies
- Reduced Hospitalization
- Team of Expert Cardiologists
- Effective & Affordable care

Mankhool | Al Qusais | Sharjah | Muhaisnah | Jebel Ali

www.asterhospitals.ae | 044 400 500