Upper airway obstruction due to goiter: An overlooked problem!

The anatomical relationship between the thyroid gland and the trachea is of great clinical importance. The intra-tracheal air flow rate may be critically compromised if the lumen is deformed by a goiter. The prevalence of upper airways obstruction due to thyroid enlargement is very poorly known and most of the previous studies are done in a small number of selected patients. In a study from the UK one-third of consecutive patients with goiter had upper airway obstruction detected by lung function tests. Surprisingly, these patients did not have more respiratory complaints than did patients with a normal lung function. This is probably explained by the fact that the thyroid enlargement usually develops over years and the patient may get used to the condition. Thus, many individuals presenting with goiter do not have respiratory symptoms and the airway obstruction must be detected by use of other methods. Imaging of the trachea can be measured by plain X-ray, computerized tomography (CT), magnetic resonance imaging (MRI) and to some extent ultrasound. Plain X-ray has a low sensitivity and shows poor correlation with the air flow rate. The cross-sectional area of the trachea can be measured by CT or MRI. Studies using these methods have been conflicting as regards the correlation to the air flow rate probably due to a relatively low precision of the imaging.

Confounding factors may be changes of the tracheal lumen caused by the respiration itself, the applied intrathoracic pressure and the position of the patient. Furthermore, even with a small increase of the tracheal area the flow rate becomes much less dependent of the luminal space according to Poiseuilles Law (flow proportional to radius 4). Thus, it seems evident that tracheal imaging cannot stand alone and a lung function test should be considered in patients with a large goiter. However, this is rarely done in the routine diagnostic setup.

In this issue of the Journal of Postgraduate Medicine Pradeep and co-workers present a prospective study of 64 patients with goiter and the effect on the lung function following thyroidectomy. The study is until now the largest of its kind. Noteworthy, the patients did not have respiratory complaints at inclusion. After thyroidectomy, improvements were found in the tidal volume and in some expiratory parameters among females and in the airway resistance among men, respectively. Unfortunately, the inspiratory function was not monitored and if done it might have revealed an even greater benefit from the operation. The study included an assessment of the tracheal diameter by X-ray but this variable was not part of the follow-up.

A favorable effect on the respiration following treatment of the goiter was reported more than 30 years ago and has been verified in subsequent studies. In one study a 25% increase of the maximal inspiratory flow rate was found after thyroidectomy even in patients with a normal tracheal radiogram preoperatively. No study of thyroidectomized patients has been performed in which both the lung function and the tracheal area were monitored.

Thyroidectomy is also effective in this context. In two previous studies in patients with large goiters radioiodine therapy resulted in an increase of the cross-sectional area of the trachea (determined by MRI) by 17-36% which correlated with the goiter reduction. The inspiratory capacity improved by 20-25% without any change of the expiratory parameters. It is likely that the exact topo-anatomical relationship between the goiter and the trachea plays a role. Thus, the benefit resulting from goiter shrinkage/removal should theoretically be greater if the trachea is encircled by the thyroid rather than just displaced from the midline, but no studies have evaluated this aspect. Most studies have shown that goiter reduction improves mainly the inspiration and to a lesser extent the expiration. During inspiration the higher air flow through a stenotic passage induces a negative transmural pressure gradient across the tracheal wall and this may cause a partial collapse of the tracheal cartilage. During expiration the drop in the transmural pressure is less critical since the pre-stenotic (i.e. intrathoracic) air pressure is above the atmospheric level. Thus, a lung function test should include the inspiratory phase of the respiration and a flow volume loop is recommended for this purpose.

The study by Pradeep et al. emphasizes that upper airway obstruction is present in a significant fraction of patients with goiter, but this problem is probably overlooked by many clinicians. Since it seems well proved by this and other studies that goiter treatment improves the respiratory function, this is a strong argument for following an active therapeutic strategy - even in relatively asymptomatic patients.
Fournier’s gangrene, still an enigma

First documented in 1883 by Professor Jean-Alfred Fournier (1832-1914), Fournier’s gangrene (FG) has continued to be of interest to physicians, especially now urologists. Women and children, not mentioned in the original report, are now known to suffer from it. However, reports on women remain scanty. It is suspected that involvement of women is underreported. New reports, even if not offering much new, will continue to be relevant for continuing medical education because of continued late diagnosis by unsuspecting physicians. Each generation of doctors will first address issues in contemporary literature before recourse to past literature.

The diagnosis of FG is largely based on the clinical features, most importantly the anatomical area of the perineum and external genitalia. Thus both males and females are prone, as found by Unalp et al., in this issue. Radiological investigations as well as histopathology may assist in defining the extent of the disease and in monitoring response to treatment. In spite of efforts to determine prognostic factors, it has been difficult to significantly reduce the mortality and consequently morbidity. The Fournier’s gangrene severity index (FGSI) was proposed by Laor et al. in 1995 to prognosticate on the outcome of the disease but does not seem to have impacted on the management universally. A part of the problem with universal application of the index lies in the low incidence of the disease, such that any one unit cannot recruit more than a limited number of patients in a period of practice. The two papers in this issue rank among the top 10 largest series on FG since 1990. Both are retrospective studies and one applied the index. In view of the low incidence of FG, it is necessary to design some prospective studies on the subject, conscious of the long period required for such a study to yield reliable and useful results. Collaborative multi-center studies are necessary. It has been observed that FGSI can be a useful basis to compare outcomes of management of FG. Without recourse to the index, every patient should be treated on the basis of individual merit and considerations.

Although in this issue of the journal, the authors did not find that anorectal source of sepsis had a worse prognosis, there could be an explanation for the findings of many authors that anorectal or colonic source of sepsis worsened prognosis. The anatomical area is awash with different types of organisms of varying virulence as well as synergism. The tissue planes permit organisms to spread. Testicular necrosis in FG is another indicator of severe disease as this points to retroperitoneal sepsis which causes thrombosis of the testicular blood vessels. The retroperitoneal sepsis limits adequate drainage unless drainage is instituted through a laparotomy. Ultimately, sepsis and its complications account for the majority of deaths in FG.

The role of diabetes mellitus is reemphasized by the two authors in this issue with figures of 35.3% and 51.3%. In a previous review of 1726 cases published in the literature diabetes mellitus was a factor in 20% of the patients. However, it is yet to be settled by authors universally whether diabetes mellitus in FG is an etiological factor, a predisposing factor or merely a co-morbid factor. All may find application in specific instances.

The ultimate goal in the management of FG is to eliminate mortality. Mortality rates in FG vary from center to center and from region to region. In an unpublished study by this author, mortality rates are lowest in Africa and highest in North America. This is in spite of advances in the management of afflicted persons. It is wise to treat every patient aggressively with available resources to prevent severe sepsis or stem the effects of sepsis. As stressed by the authors in this issue and others, aggressive treatment involves resuscitation with fluids and multiple parental antimicrobial agents and unrelenting excision of all necrotic tissues as they present. Many patients will be cured without the need for colostomy, grafts or hyperbaric oxygen treatment.

References