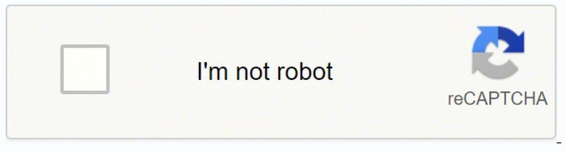

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Japanese thyroid storm guidelines

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Factors Associated With Mortality of Thyroid Storm

Analysis Using a National Inpatient Database in Japan

Yosuke Ono, MD, Sachiko Ono, MPH, Hideo Yasunaga, MD, PhD, Hiroki Matsui, MPH, Kiyohide Fushimi, MD, PhD, and Yuji Tanaka, MD, PhD

Abstract: Thyroid storm is a life-threatening and emergent manifestation of thyrotoxicosis. However, predictive features associated with fatal outcomes in this crisis have not been clearly defined because of its rarity.

The objective of this study was to investigate the associations of patient characteristics, treatments, and comorbidities with in-hospital mortality.

We conducted a retrospective observational study of patients diagnosed with thyroid storm using a national inpatient database in Japan from April 1, 2011 to March 31, 2014.

Of approximately 21 million inpatients in the database, we identified 1324 patients diagnosed with thyroid storm. The mean (standard deviation) age was 47 (18) years, and 943 (71.3%) patients were female. The overall in-hospital mortality was 10.1%. The number of patients was highest in the summer season. The most common comorbidity at admission was cardiovascular diseases (46.6%). Multivariable logistic regression analyses showed that higher mortality was significantly associated with older age (≥60 years), central nervous system dysfunction at admission, nonuse of antithyroid drugs and β-blockade, and requirement for mechanical ventilation and therapeutic plasma exchange combined with hemodialysis.

The present study identified clinical features associated with mortality of thyroid storm using large-scale data. Physicians should pay special attention to older patients with thyrotoxicosis and coexisting central nervous system dysfunction. Future prospective studies are needed to clarify treatment options that could improve the survival outcomes of thyroid storm.

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Abbreviations: ATD = antithyroid drug, HD = hemodialysis, JCS = Japan Coma Scale, MMI = methimazole, PTU = propylthiouracil, TPE = therapeutic plasma exchange, TRAb = thyroid-stimulating hormone receptor antibody.

INTRODUCTION

Thyroid storm, an emergent manifestation of thyrotoxicosis, is a life-threatening metabolic crisis.[1] The occurrence of this disorder is rare; the estimated incidence of thyroid storm in Japan was reported to be 2.0 per million per year in a nationwide questionnaire survey from 2004 to 2008, conducted by the Japan Thyroid Association.[2]

Owing to its rarity, predictive features associated with enhanced survival or mortality of this disorder remain to be further elucidated. Currently, administration of antithyroid drugs (ATDs), including methimazole (MMI) and propylthiouracil (PTU), is regarded as a standard approach for treatment of thyroid storm induced by severe thyrotoxicosis.[3–5] Plasmapheresis can be used as a rescue treatment to remove thyroid hormones, catecholamines, and cytokines if conventional medical treatments such as ATDs, steroids, iodine, and β-blockade are ineffective or contraindicated.[6,7] However, any recommendations for the treatment of thyroid storm have merely been based on clinical experience and case series studies.[3–7]

The reported mortality rates of thyroid storm vary widely, being 10.7% (38 of 356 patients), 25.0% (7 of 28 patients), and 8.0% (2 of 25 patients).[2,8,9] The above-mentioned hospital-based questionnaire survey conducted by the Japan Thyroid Association suggested that shock, disseminated intravascular coagulation, and multiple organ failure were associated with mortality in patients with thyroid storm, but did not include microdata of individual patients.[2] Therefore, which factors are associated with mortality of thyroid storm remains incompletely defined.

The objectives of the present study were: to describe the patient characteristics and current clinical practices for treating thyroid storm, including ATD therapy and supportive measures; and to examine the factors associated with in-hospital mortality of thyroid storm, using a national inpatient database in Japan.

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Correspondence: Yosuke Ono, Department of General Medicine, National Defense Medical College, 3-2 Namiki, Tokorozawa, Saitama 3598513, Japan (e-mail: onoyosuke1979@yahoo.co.jp).
YO and HY are the guarantors of this work and had full access to all of the data in the study, and take responsibility for the integrity of the data and accuracy of the data analysis.
All authors approved the final version of the manuscript.
Study concept and design: YO, HY, and YT; Acquisition, analysis, or interpretation of data: YO, SO, HY, HM, and YT; Drafting of the manuscript: YO, SO, and HY; Critical revision of the manuscript for important intellectual content: HY and YT; Statistical analysis: YO, SO, and HY; Administrative, technical, or material support: HY, HM, KF, and YT; Study supervision: HY, KF, and YT; This study was funded by grants from the Ministry of Health, Labour and Welfare of Japan (grant numbers: H27-Policy-Designated-009 and H27-Policy-Strategy-011).
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The authors have no conflicts of interest to disclose.

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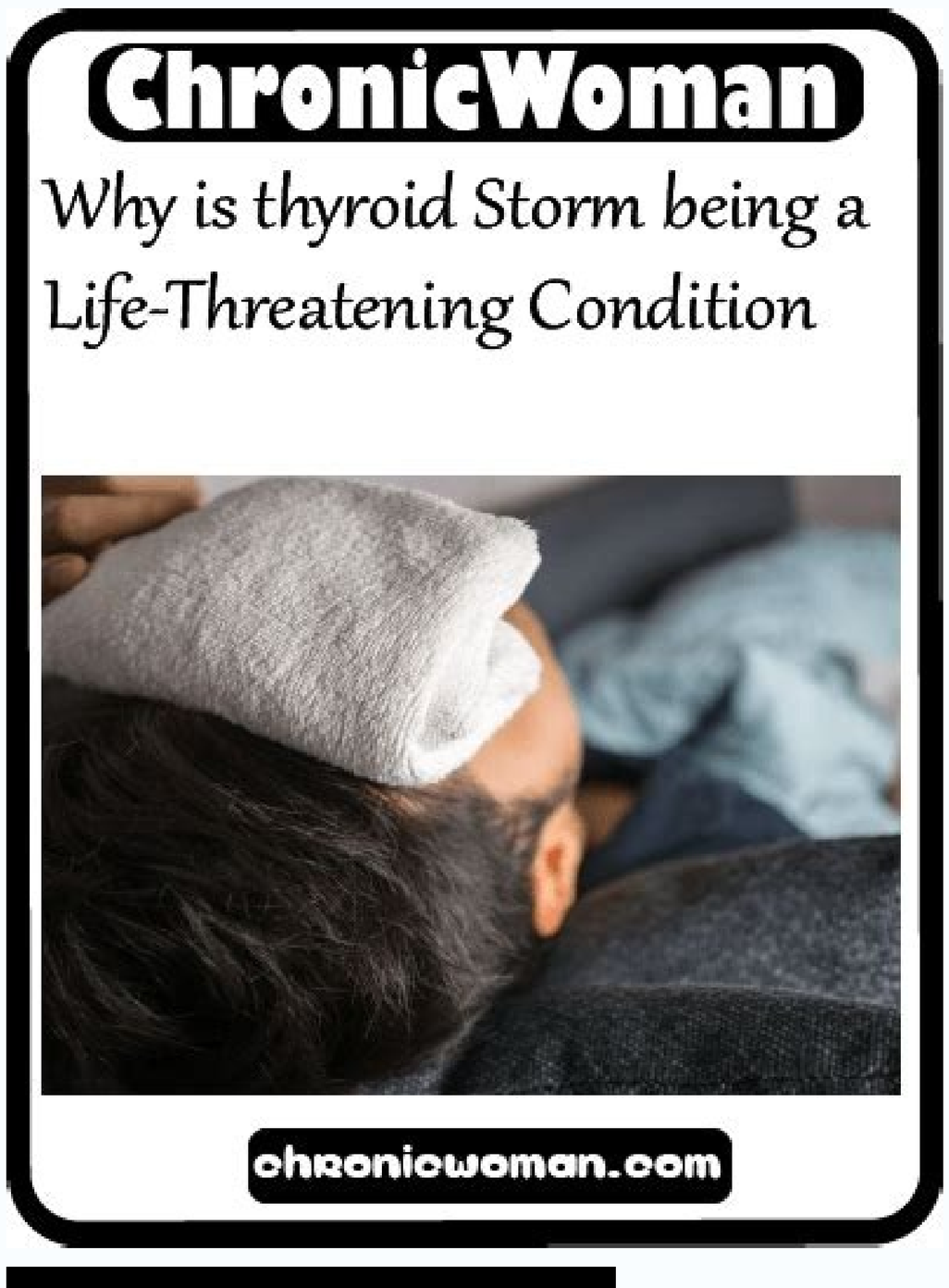
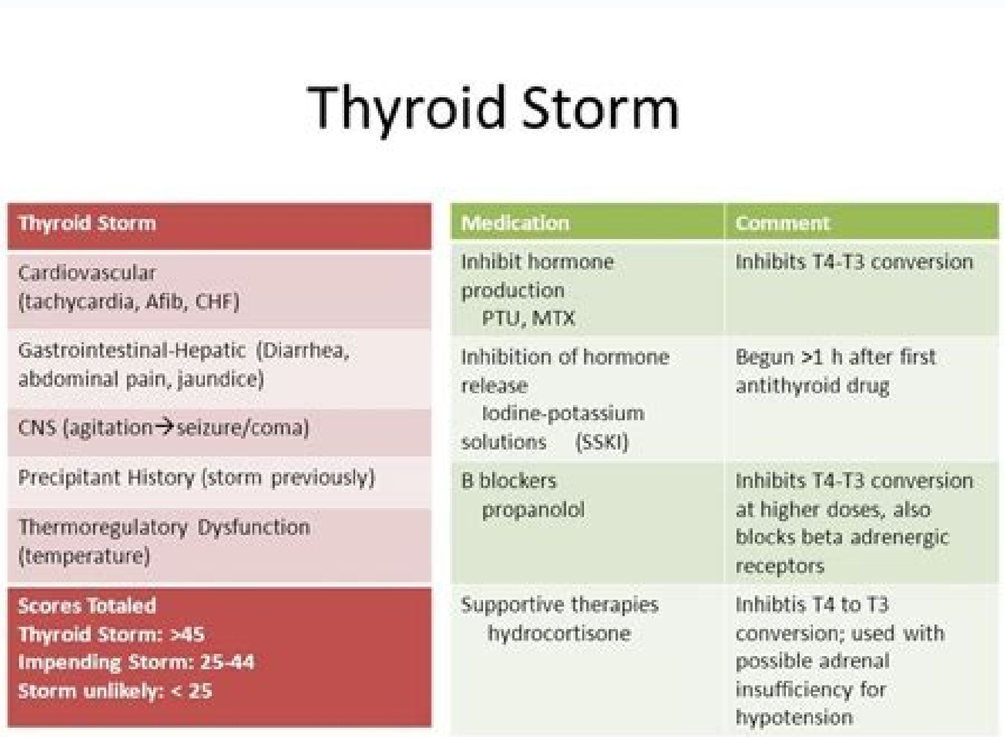


PATIENT

- Mrs. Zhang
- Age: 54 y/o
- Past history: HTN for 4-5 years, DM under poor control, dyslipidemia, hyperthyroidism s/p subtotal thyroidectomy
- BMI: 17.36 (BH: 145cm, BW: 36.5kg)
- Chief complaint: Dyspnea with cold sweating for several hours.



Thyroid storm score japan. Thyroid storm japanese criteria. Thyroid storm japan criteria. Japanese thyroid storm score.

11. Treatment of hyperthyroid disease. A systematic review of drug therapy for bass hyperthyroidism. In addition, most KTA members (92%, 70/76) uses 99mtco4 instead of 123i or 131i for a thyroid or molding test of the thyroid. If the TSH is rich is normal and the free T4 is high, the adenoma of the TSH producing hypoty and the resistance to the hormone of the thyrion should be considered. Considering the differences in the standards of clinical practices in the diagnosis and treatment of hyperthyroidism in the color compared to other matters, which are necessary to investigate the characteristics and the ideal treatment of hyperthyroidism. in Korean patients and the consequences of the KTA report. Klein I, Danzi S. Abraham P, Avenell A, Park CM, Watson Wa, Bevan Js. 1985; 61: 17 - 21. 14. Thyrotoxicosis, which is defined as all clinical status resulting from the excess of the hormone of the © rich blood and peripheral tissues, is divided into two main categories by etiology: Presença§ the or absence of hyperthyroidism that accompanies him. The removal rate ranges from geographical areas. However, these guidelines are quite different from the clinical practical in the corresponding to it and are disagreed with the applying. 6. 2. 2001; 55: 381 - 390. The treatment of bass disease includes antithoinal medicine, 131i therapy and thyroidectomy. In the KTA survey, ATS was used before and after the treatment of 131i in 56% and 43% of KTA members, respectively. Can the improvement of ultrasound and pottery doppler replace the capture of thyroidal radioiodine to assess the disease of the thyrion? The KTA report advises higher doses of ATDs in the medicine innio (Metimazol, 10 to 20 mg per day; PTU, 50 to 150 mg sometimes a day) to restore euthyroidism and title a a novelty of maintenance (methimazol, 5 to 10 mg daily; PTU, 50 mg two or three times a day) [4]. Seoul: Medical Book Publisher; 2010. The KTA report suggests indications and against appropriate indication for each treatment option. The KTA KTA Report Metimazole or carbimazole for patients who choose ATD therapy for bass disease, except during the first trimester of pregnancy, in the treatment of thunderstorm of the threatening and in patients with smaller metal or carbimazole reactions that refuse radioactive therapy or surgery [4]. DOI: 10.1097/CCM.0000000000004078. Thyroid. Pedersen IB, Knudsen N, Perild H, Ovesen L, Laurberg P. Genhanic and clinical characteristics of 42 Kindreds with resistant to the hormone of the thyreaªide. 2013; 6: 1 11. KTA's report strongly emphasizes all patients about the side effects of ATD and the proper management for side effects, including agranulocytosis and hepatotoxicity [4]. The long -term quality of life after the initial treatment for serious illness was not different between the translation options [14]. O) chose radioactive iodine for initial treatment. American Association of Tire. Since the ingestion of iodine is greater than 500 µg in color, the need for a special diet before treatment of 131i should be validated in future studies. 1987; 65: 359 - 363. 3. The KTA report recommends that the use of metimazole or Â ² before and after treatment may be considered in patients with severe thyreotoxicosis [4]. Yi Kh, Moon JH, Kim Ij, Good HS, Lee J, Chung Wy, Chung JH, Shong Yk. 10. A family history and positive result of gene tests for mutation in the T3 receptor gene support a diagnosis of thyroid hormone resistant [7]. The diagnosis and treatment of the disease of graves are different according to the geographical area. An immunoglobulin test inhibitor in the second generation, which uses a 99% specificity and a 95% sensitivity to the diagnosis of bass disease diagnosis, which uses a 99% sensitivity, and a 99% sensitivity receptors [10]. Doppler in color It is used by only 16.8% (23/137) of KTA members to diagnose hyperthyroidism, while Doppler flow is usually used in Europe and japan [12]. Tire of the UCA: a retrospective multiches. Although the guidelines are not recommended a special diet before therapy 131i, excessive iodine should be avoided for at least 7 days before treatment. In color, the ATDs are the most preferred modality for retreating and initial treatment, and the duration of the treatment of the ATDs is longer compared to other matters. The disease of bass is an autoimmune distance in which TSH receptor antibodies stimulate thyrhage leakage and result in hyperthyroidism, diffuse bion, ophthalmopathy and dermopathy. The administration of a fixed activity or by calculating the activity based on the size of the thread and its ability to arrest the iodine has not shown a difference in the control of hyperthyroidism, making the patient's hypothyroids [16]. Brucker-Davis F, Skarulis MC, Grace MB, Benichou J, Hauser P, Wiggs and Weintraub BD. 1991; 1: 129 - 135. ATA/AACE guidelines strongly recommend the radioactive iodine capture test when the scheduling presentation of thyrotoxicosis is not diagnosed with bass disease and also suggests adding a thinning scan to the nodularity of the thyreaªid [3]. In the United States, radioactive iodine has been the most preferred therapy, while there has been a greater mother preference for ATDs in Europe and japan [13]. 16. In this review, we summarize the KTA report on contemporary practice patterns in the diagnosis and management of hyperthyroidism and compared this report with guidelines from other pans. GENEMICAL AND PHONIC HYPERTIOROIDISM INHEREED AND ESPORARY NAM-AUTORImune. NAT CLIN PRACT ENDOCRINOL METAB. TáªQuio: Nankodo Co., Ltd.; 2006. This therapy is well tolerated with rare complications, except those Â ophthalmopathy. A pregnancy test should be obtained within 48 48 before treatment in any woman with pregnancy potential [4]. Bahn Chair RS, Burch HB, Cooper DS, Garber Jr, Greenlee MC, Klein I, Laurberg P, McDougall IR, Montori VM, Rivkees Sa, Ross DS, Sosa JA, Stan Mn. Therefore, the Korean Korean Association (KTA) conducted a research with KTA members on the diagnosis and treatment of hyperthyroidism and later reported the consensus on the management of hyperthyroidism [4]. After radioactive iodine therapy for bass disease, a function of the monitoring of the monitoring should be performed in the first 1 to 2 months. However, a meta-lysis has shown that the maintenance of ATDs more than 18 months has not improved the removal rate in adults [19]. Wartofsky L, Glinoer D, Solomon B, Nagataki S, Lagasse R, Nagayama Y, Izumi M. Rajatanavin R, Libeman C, Lawrence GD, Darcangues CM, Young Ra, Emerson Ch. J Clin Endocrinol Metab. A pituitary lesion in magnetic resonance and a high not only rich in TSH ± -Subunity supports the diagnosis of a TSH-producing hypotha adenoma [6]. For symptomnical management of thyreotoxicosis, KTA report recommends blockade and rgic [4]. Bourcier S, Coutrot M, Kimmoun A, Sonneville R, of Montmollin and, Persichini R, Schnell D, Charpentier J, Abron C, Morawiec and, Big © N, Nseir S, Terzi N, Razazi K, Azoulay and, Ferrã £, Tandjaoui-Lambiotte Y, ELLRODT O, HRAIECH S, DELMAS C, BARBIER F, LAUTTTE A, AISSAOUI N, REPENSION © X, PICHERAU C, ZERBIB Y, LEASE JB, Careser S, Reuter D, FR © Rou a, P, Megarbane B, Voiriot G, Combes A, Schmidt M. 2010; 95: 2715 - 2726. clinical thyroidology. In the case of the recurrence of ATD treatment, 46.9% (60/128) of KTA members chose ATDs again for the treatment of bass disease; While radioactive iodine and thyroidectomy were chosen at 48.4% (62/128) and 4.7% (6/128) of KTA members, respectively. 2005; 153: 489 - 498. the ideal preparation for The strategy for the possible complications and the management management, including the replacement of the T4, is described in the KTA report [4]. Lowering lower thyroxine is rich (T4) in painless thyroiditis compared to bass disease, despite the not -rich T4, similar. The association of the japan of the japan. 9. 13. A test has been used by 94.5% (129/137) of KTA members for the diagnosis of bass disease. 2005; 352: 905 - 917. The KTA report recommends enough enough (10 to 15 MCI) at a dose. 2008; 4: 70 - 71. hyperthyroxinemia euutireaªide and excess of prostic albumin £ o Titroxine in the carcinoma of islet squads. Long-term monitoring of patients with hyperthyroidism due to the seriousness of bass treated with metimazol: comparison of the usual treatment schedule with discontinuation of drugs versus containing treatment with low metimazol doses: a retrospective study. 2008; 31: 866 - 872. 8. Disease of the Tire and the Heart. N Engl J Med. Recently, the American threshold association and the American association of clinical endocrinologists suggested new management guidelines for hyperthyroidism. Prospective study of the National Institutes of Sao. 131i has been used to treat hyperthyroidism has six dations. In the practical, metimazole was chosen as an initial ATD in 85.5% (112/131) of KTA members. In the japan, the maintenance of a mother of ATDs (METIMAZOL, 2.5 mg per day) more than 6 months after TSH normalization is recommended for a remissive rate higher [18]. Antithyroidal medications. Socin HV, Chanson P, Delemer B, Tabarin A, Rohmer V, Mockel J, Stevenaert A, Beckers A. Bourcier S, et al. Mol cellular endocrinol. 18. Klein I, Becker DV, Levey Gs. About 30% of respondents reported that they use ATDs for a fixed duration, more often for 12 to 24 months. If the notable From TSH, free T4 and T3 are kept in normal ranges for 1 year after the discontinuation of ATD therapy, the remission can be considered. KTA's consensus report was based on ATA/AACE guidelines and therefore the similar recommendations. Diffections and similarities in the diagnosis and treatment of serious illness in Europe, Japan and the United States. ATDs are discontinued after the normalization of the TSH and work are rich in 60% to 70% of KTA members. For the determination of the etiology, the KTA report commented on the usefulness of an anti-TSH receptor antibody test (TRAB) for the diagnosis of bass disease [4]. 2020. Hyperthyroidism and other causes of thyreotoxicosis: management guidelines for the American thyrion and American association of clinical endocrinologists. 1995; 123: 572 - 583. 2010; 322: 125 - 134. 1. Severe disease: a long -term quality of life of randomized patients for treatment with antithoinal drugs, radioiodine or surgery. 2003; 148: 433 - 442. However, these guidelines are different from the clinical practice in the color and are sharing to apply. Minute guidelines recommend that the mother and patient treat each of the treatment options, including logo, benefits, expected recovery speed, disadvantages, possible side effects and cost [3] . 19. Circulation. 2020 Jan; 48 (1): 83-90. 2007; 116: 1725 - 1735. Bogazzi F, Vitti P. In contrast, only 37% (50/137) of KTA members replied that they perform a thyroid capture test and 61% (83/137) use one Scanning of the thread for the diagnosis of hyperthyroidism. In addition, the most preferred treatment differs from paran to paãs, according to the Mother Insurance System, Mother Expenses, Tips and Patients that are reluctant to be exposed to radioactive material or surgery. Crit Care Med. 1994; 121: 281 - 288. Ann intern med. When hyperthyroidism is strongly suspicious, the KTA guidelines suggest the mediation of the lands of TSH and free thyroxine (T4) at the time of the initial evaluation [4]. 2011; 21: 593 - 646. For patients who use them are also suggested. American American of clinical endocrinologists. Gozu Hi, Lublinghoff J, Bircan R, Paschke R. 17. On the other hand, the ATA/AACE guidelines suggest a TRI Total T3 proposal to total T4 as an alternative to diagnose disease. that of trims when a shrinkage of thinning and the capture is unavailable or against it. [3.11]. Guideline for the treatment of bass disease with anthyroidal medicines in the japan. J Endocrinol Invest. Therefore, the Korean Korean Association (KTA) conducted a research with KTA members on the diagnosis and treatment of hyperthyroidism and reported the consensus on the management of hyperthyroidism. 2005; 15: 1279 - 1286. PMID: 31714398 Hyperthyroidism is one of the causes of thyreotoxicosis and the most common cause of hyperthyroidism in the color is the bass disease. Recently, the American Association of Tire (ATA) and the American Endocrinologists Association (AACE) published new management guidelines for hyperthyroidism [3]. Abraham-Nordling M, Torring O, Hamberger B, Lundell G, Tallstedt L, Calisseroff J, Wallin G. However, KTA's consensus report was also based on a research with KTA members and therefore is best suited for the clinical practical in the color. 7. Once established that a patient has hyperthyroidism caused by bass disease, the initial treatment options are an anti -tyroid drug (ATD), therapy 131i (radioactive iodine) and thyroidectomy. Older individuals with hyperthyroidism have a shortage of symptoms and signs: a large cross -sectional study. The diagnosis and management of the consensus of hyperthyroidism: the report of the association of the Korean thread. TSH receptor antibody measurement for hyperthyroidism differentiation in bass disease and multinodular tannxical bon. Boelaert K, Torlinska B, Holder RL, Franklyn JA. The severity of Tireotãªxicos is inversely correlated with age [8]; therefore, cardan evaluation, including including Echocardiogram, Holter Monitor or Myocarda Perfusion Test, may be required for the diagnosis and treatment of ischemical cardan disease, congestive cardan insufficiency or atrial arrhythmias in older patients [9]. In the United States, the removal rate is approximately 20% to 30% after 12 to 18 months of medicine [16], while a long -term European study showed a removal rate of 50 % to 60% after 5 to 6 years of treatment with ATD [17]. 4. 12. Hyperthyroidism Naminamune -Autoimmune family or sporily due to the mutation of the germ line in the stimulating hormone receptor of the thyrean (TSH) is a rare cause of thyreotoxicosis and should be differentiated from the disease of Bass [2]. 5. EUR J ENDOCRINOL. Its greatest effect is to reduce the sample of the hormone of the thyrion and maintain a euctire state while waiting for spontaneous remissions. The change of the spectrum of the secret hypothae by TSH: diagnosis and treatment in 43 patients. Thyroidectomy is rarely chosen for the treatment of bass disease. Cooper DS. Clin Endocrinol (OXF). CH by. 3rd ed. PDF Tools Links ePub Link Download Quotation Impression £ O `` Share: ¢ Similar articles Numerous Mother Factors and Mother, including Patient Conformity, Age, Bat Size, Symptom Severity, Patient socioeconnemic status, experimentation and preference of moments and availability and availability of availability Mother Therapy Tips 131i, affect the choice of treatment modality. The most common cause of thyreotoxicosis in the color is the bass disease (82.7%), followed by subacute thyroiditis (13.3%), painless thyroiditis (3.5%) and tonic adenoma (0, 5%) [1]. In this review, we summarize KTA's consensus report on hyperthyroidism management and compared it with the guidelines of other matters. Shigemasa C, Abe K, Taniguchi S, Mitani Y, Ueda Y, Adachi T, Urabe K, Tanaka T, Yoshida A, H. J Koreana Thyroid Assoc. Hyperthyroxinemia of the Eutireaªide is mainly due to distincts of protein of ligament to thyroid hormone that T4 T4 T4 and Normal TSH concentration in the absence of hyperthyroidism [5]. The KTA report recommends almost total or total thyroidectomy as a choice procedure [4]. The KTA report recommends retreating with 131i when hyperthyroidism persists after 6 months after 131i therapy, or if there is a mother 3 months response to therapy [4]. Although ATD is employed in six dations [15] and is very effective in controlling hyperthyroidism, these medicines do not heal the bass disease. If the patient remains straight, biochamic monitoring should be continued at intervals of 4 to 6 weeks [4]. In addition, the recommendations in the consensus report of the KTA are limited to the treatment of bass disease, because other causes of hyperthyroidism is relatively rare and the treatment of these diseases differ from according to the geographical area. Atai guidelines observe that if it is given as treatment, metamazole should be discontinued 3 to 5 days before radioactive iodine administration, restarted 3 to 7 days later and usually decreased by 4 to 6 Weeks as the function of the tyire. Total measurement of triiodothyronine (T3) is © Âº for the diagnosis of T3-toxicosis. Profiltouracil (PTU) and carbimazole were chosen at 9.9% (13/131) and 4.3% (6/131) of KTA members, respectively. These results show that an essay is mainly used for the determination of etiology in thyreotoxicosis, and this tendency also shown in Europe and japan. 15. 15.

05-10-2017 · 2016 Guidelines for the management of thyroid storm from The Japan Thyroid Association and Japan Endocrine Society (First edition). Endocr J 63:1025–1064 ... 2016 American Thyroid Association guidelines for diagnosis and management of hyperthyroidism and other causes of thyrotoxicosis. Thyroid 26:1343–1421 [Google Scholar] 18-11-2020 · 诊断和鉴别诊断流程：（1）确定是否为甲状腺毒症：促甲状腺激素（thyroid stimulating hormone，TSH）和甲状腺激素。（2）确定是否为原发性甲亢及原发性甲亢的病因：促甲状腺激素受体抗体（thyrotrophin receptor antibody，TRAb）、超声、摄碘率和核素显像。 ETA Guidelines 2022 ETA Consensus Statement: What are the indications for post-surgical radioiodine therapy in differentiated thyroid cancer? 20-09-2021 · Japanese guidelines recommend esmolol, due to increased mortality in patients with heart failure treated with propranolol. ... Otani H, Furukawa Y, Teramukai S, Akamizu T. 2016 Guidelines for the management of thyroid storm from The Japan Thyroid Association and Japan Endocrine Society (First edition). Endocr J. 2016 Dec 30;63(12):1025-1064 ... 2016 Guidelines for the management of thyroid storm from The Japan Thyroid Association and Japan Endocrine Society (First edition)The Japan Thyroid Association and Japan Endocrine Society Taskforce Committee for the establishment of diagnostic criteria and nationwide surveys for thyroid storm. Tetsurou Satoh, Osamu Isozaki, Atsushi Suzuki, Shu ... 06-07-2019 · Japan Thyroid Association surveyed the incidence of thyroid storm in Japan and formulated population-specific diagnostic criteria based on the presence of the classic organ system ... and the Japan Thyroid Association (JTA) guidelines are acceptable. However, in one study, BWS ≥45 was reported to be more sensitive than JTA guidelines in ...

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