



# Towards understanding Cotard's syndrome: an overview

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### Practice points

- Nihilistic delusions concerning the individual's body are the central features of Cotard's syndrome.
- Both psychiatric and somatic disorders can cause Cotard's syndrome, so profound diagnostic work-up is needed.
- The epidemiology is unclear, but the syndrome is proposed to be rare.
- Cotard's syndrome in young adults or adolescents seems to be associated with bipolar disorder.
- Treatment should be directed towards the underlying condition. In the case of depression with psychotic features, successful treatment with electroconvulsive therapy is frequently demonstrated.
- The two-factor model and the interactionist model (two related models) are the most important etiologic hypotheses for delusions of misidentification, but empirical data for Cotard's syndrome are scarce.
- Study of phenomenologic syndromes, such as Cotard's syndrome, could be helpful in allowing a better insight into brain functioning or the pathophysiological mechanism of delusions.

**SUMMARY** Cotard's syndrome is a rare disorder. The central feature is a nihilistic delusion concerning one's own body (including loss of body parts, being dead or not existing at all). The syndrome is not mentioned in DSM-IV-TR or the International Classification of Diseases-10, since there is growing consensus that the syndrome is part of an underlying disorder. Although not a separate diagnostic entity, the phenomenologic study of rare monothematic delusional disorders (such as Cotard's syndrome) remains important to have a better understanding of the pathophysiology of delusions. In this report, historical aspects, classification, course and epidemiology are briefly reviewed, different pathophysiologic hypotheses are described and therapeutic options are discussed.

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### Historical aspects & classification

Cotard's syndrome is named after Jules Cotard (1840–1889), a French neurologist who described this condition for the first time in 1880. He formulated a new type of depression characterized by anxious melancholia, ideas of damnation or rejection, insensitivity to pain, delusions of nonexistence concerning one's own body and delusions of immortality. He categorized this under 'lypémanie', a kind of psychotic depression [1]. Later, Cotard introduced 'délire des negations' as a new terminology for the syndrome [2]. Séglas introduced the eponym 'Cotard's syndrome' in 1887 [3]. A few years later, Régis linked the syndrome to other psychiatric disorders [4].

In later years, several attempts to classify different types of the syndrome were made [5]. In 1995, for the first time a classification was made based on evidence using factor analysis of published cases. As a result, three types were proposed. A form of psychotic depression with prominent anxiety, melancholic delusions of guilt and auditory hallucinations was defined as the first type. Hypochondriac and nihilistic delusions with the absence of depressive episodes were the characteristic features of the second type: Cotard's syndrome type I. In the third type, symptoms could be clustered around anxiety, depression, auditory hallucinations and suicidal behavior: Cotard's syndrome type II [6].

In our currently used classification systems, DSM-IV-TR and the International Classification of Diseases-10, Cotard's syndrome is not defined as a separate entity. Nihilistic delusions as a symptom are mentioned in DSM-IV-TR and classified as mood congruent delusions within a depressive episode with psychotic features [7].

### Presentation & course

Nihilistic delusions concerning the individual's body are the central features of Cotard's syndrome. In his first publication, Cotard pointed out six characteristic symptoms: anxious melancholia, ideas of damnation or possession, suicidal behaviors and self harm, analgesia, hypochondriac ideas of nonexistence or destruction of organs, the whole body, the soul or God, and ideas of immortality [1].

In an analysis of 100 cases, the most prominent symptoms are depressive mood (89%), nihilistic delusions concerning one's own existence (69%), anxiety (65%), delusions of guilt

(63%), delusions of immortality (55%) and hypochondriac delusions (58%) [6].

A classical description of the course of Cotard's syndrome is given by Enoch and Trethowan [8]: "In its early stages Cotard's syndrome is characterised by a vague feeling of anxiety, with a varying time-span from weeks to years. This anxious state gradually augments and can result in nihilistic delusions, where denial of life or denial of body parts are the prominent features." A preoccupation with guilt, despair and death are core symptoms [8]. In these patients, there is an increased tendency to automutilation and suicidal behavior [8]. Evolution to the 'manic Cotard's syndrome' or 'délire d'énormité' (a delusion of massive increase of body measures) can be present [8]. Since this syndrome occurs in association with other psychotic states, symptoms of these specific disorders are present [8]. Since Cotard's syndrome can be seen as a phenomenologic feature in another disorder, the duration can differ from weeks to years [9].

In his proposal for staging Cotard's syndrome, Yamada defined three stages: the germination stage; the blooming stage; and the chronic stage [10]. Characteristic symptoms of the germination stage are hypochondria, cenesthopathy and depressive mood. In his proposal, it is not yet possible to make the diagnosis of Cotard's syndrome in this stage. The typical features of Cotard's syndrome (nihilistic delusions and delusions of immortality together with anxiety and negativism) appear in the blooming stage. When the syndrome evolves to the chronic stage, two different types are differentiated: the depressive type with persistent disturbances; and the paranoid type, where depressive symptoms are less prominent [10]. Evidence for this hypothesis is limited, and only supported by two case reports [10,11].

### Epidemiology

Good epidemiologic data about the syndrome are not available. There are a few studies available, although only a very limited number of cases include Cotard's syndrome.

A prevalence study in a selected psycho-geriatric population in Hong Kong found Cotard's syndrome in two out of 349 patients. A prevalence of 3.2% was reached when only severely depressed elderly were included [12]. In a Mexican sample (screened over a 2-year period) of primary psychiatric patients, 0.62% (n = 3)

of patients had Cotard's syndrome. Using the same methodology as above, 0.11% (n = 1) of patients had Cotard's syndrome in a sample of neurological patients with mental disturbances [13].

The likelihood of developing Cotard's delusion appears to increase with age [14]. A mean age of 56 years old was found in an analysis of 100 cases [6], and more recently, a mean age of 47.7 years was found in an analysis of 138 case reports [15]. Women seem to be more vulnerable than men [8]. The syndrome is found in different ethnic groups [14]. The presence of Cotard's syndrome in people under 25 years of age was described to be associated with bipolar disorder [15].

Cotard's syndrome is currently conceptualized as part of an underlying disorder. Several psychiatric and somatic diseases have been associated with the syndrome. Unipolar and bipolar depressions are the most common associated psychiatric disorders, but psychotic disorder is also frequently reported [5]. In a recent review, several organic conditions were listed: dementia; major depressive episode in mild cognitive impairment; depression in frontotemporal atrophy; severe mental retardation; typhoid fever; cerebral infarction; superior sagittal sinus thrombosis; brain tumors; temporal lobe epilepsy; limbic epileptic insults; postictal depression; cerebral arteriovenous malformation with and without epilepsy; migraine; Laurence–Moon–Bardet–Biedl syndrome; multiple sclerosis; Parkinson's disease; brain injury; noninfectious complications of heart transplantation; consequences of adverse drug reaction to acyclovir and valacyclovir; and herpetic or nonherpetic encephalitis [5]. More recently, case reports of Cotard's syndrome in semantic dementia [16] and tuberculosis infection in an HIV patient [17] have been published.

## **Etiology & pathogenesis**

### **■ Neuro-imaging**

Most neuro-imaging data show no gross structural changes in the brain in Cotard's syndrome [14]. It has also been observed that right frontal damage has commonly occurred in cases of delusional misidentification (including Cotard's syndrome). However, left lesions are also described. Using molecular neuro-imaging modalities, not all studies show right-sided hypofunctionality [14,18]. There seems to be a correlation between prefrontal dysfunction and nihilistic beliefs in neurological patients [14].

### **■ Psychological & neuropsychological factors**

In a traditional view, a depersonalization phenomenon was reported as an essential step in the development of Cotard's syndrome by Séglas (1887) [3]. Alheid elaborated depersonalization in the Cotard's syndrome context using the German terminology 'Leib' (body for me) and 'Körper' (body as such). Depersonalization may occur when 'Körper' prevails over 'Leib', and when the body is less associated with the self ('Leib'). However, in depersonalization, the patient feels like they are dead (indifference of affect) while in Cotard's syndrome the patient is convinced they are dead (lack of feeling) [8,19].

It is believed that personality characteristics have an essential role in the development of Cotard's syndrome [2,8]. The neuropsychological origin of Cotard's delusion is supposed to be related to a dysfunction of an information processing subsystem where face and body recognition is associated with a changed affective component (or changed feeling of familiarity). When this affective component is lacking, the patients may experience a feeling of derealization and depersonalization [20]. For several misidentification syndromes, especially Capgras' syndrome (a delusion where familiar persons are replaced by identical imposters), this hypothesis is supported [21–23]. In studies on face recognition tasks with skin conductance response as an outcome measure for the affective component, the differential autonomic response to familiar faces compared with unknown faces is absent in patients with Capgras' syndrome [22,23]. Taking this mechanism into account for Cotard's syndrome, two explanations were proposed. First, a difference in attributional style between Cotard's and Capgras patients could be responsible for a different phenomenology of a possible identical lesion. Patients with a more internal attributional style (which is often co-occurring with depression) are proposed to be more vulnerable to develop Cotard's syndrome, while those with a more external attributional style (which is often co-occurring with paranoia) are more prone to develop Capgras' syndrome [24]. This hypothesis was empirically supported in one case that reported significantly higher scores on two attribution bias indices compared with control subjects [25]. On the other hand, co-occurrence of both Cotard's syndrome and Capgras' syndrome has been reported. A combination of attribution styles in these patients is proposed,

in that they are both depressed and paranoid, or suffering from delusions about self-identity and the identity of others. For this hypothesis, evidence-based proof is lacking [5]. As part of this attribution hypothesis, delusional patients, like normal people, interpret perceptual phenomena in the light of a set of background beliefs whose structure is a product of social/contextual influences and individual psychological dispositions [24]. In the second explanation, a lack of autonomic response in Cotard's syndrome is suggested (but still hypothetical since no data about autonomic response in these patients have been published), whereas in Capgras' syndrome this lack of response is limited to familiar face recognition (or familiar persons) [26,27].

In most neuropsychological models, the idea of a changed affective component is incorporated, but the role they account for it differs.

#### One-stage model

In the one-stage model, the difference between normal and delusional subjects consists of perceptual or other malfunctions that produce an anomalous experience, and this anomalous experience gives the subject good evidence for their delusional belief [24]. Formation of the delusional belief is a rational process [28].

#### Two-stage model

In the two-stage model the perceptual or other malfunction is not enough for a delusional disorder. There are known disorders (e.g., pure autonomic failure as a comparator for Cotard's syndrome) where patients have this perceptual anomalous experience, but do not develop a delusional disorder. This second factor is responsible for the failure to reject the hypothesis (e.g., "I am dead" as an explanation for the lack of feeling of familiarity to anything) despite the presence of (often overwhelming) evidence against it [26,27]. The two-stage explanation claims an anomalous experience at the first stage and some form of cognitive disruption at the second [28]. The importance of the right dorsolateral cortex for the hypothesis of this second factor was demonstrated with functional MRI [29–31]. It has also been observed that right frontal damage commonly occurs in cases of delusional misidentification (including Cotard's syndrome) [14,26].

#### Expressive theory

According to the expressive theory, the delusional subject is not expressing beliefs at all

because a proposition so clearly falsified by other facts available to the subject, and hence disqualified by the proper application of procedural rationality, cannot be sincerely believed. They use what we might call the language of beliefs to express the bizarre and disorienting nature of the experience [24]. Support for this theory is rather limited.

#### Change in existential orientation

In this model, the explanation of delusions of misidentification is grounded in changes to the patient's existential feeling, as proposed by Ratcliffe [28,32]. Here, the delusional content is simply an expression of a more general alteration in existential feeling. Reasoning impairments are embedded in a background of existential feeling, rather than coming after an anomalous experience [28]. This contrasts with other more 'spectatorial models' (the patient as a spectator of an anomalous experience, where perceptions and experiences are constructed as a kind of input system through which perceptual contents are presented) [28].

#### Interactionist model

In the interactionist model, a more bidirectional account, with a greater emphasis on the patient's underlying phenomenal experience was proposed. The classical top-down process explanation of one- and two-stage models are integrated. An interaction of top-down and bottom-up processes to better explain the maintenance of the delusional belief is put forward. In the bottom-up process, once a belief is formed, it will affect how the subject interprets the observational data, and becomes predisposed to see what is expected. It also places a greater emphasis on the patient's underlying phenomenal experience in accounting for the specificity of the delusional content [28].

In one Cotard patient, there is empirical data supporting this bottom-up process: neuropsychologic research with an emotional stroop paradigm showed an attentional bias for words related to death. The role of attentional bias is to reinforce and maintain delusional beliefs by constantly focusing the patient's attention onto any relevant information [33].

#### Treatment

Treatment should initially follow current treatment guidelines from the DSM-IV-TR diagnosis, which Cotard's syndrome forms part of.

Several reports have been published, but no randomized studies have been performed for Cotard's syndrome:

- The most commonly reported strategy is electroconvulsive therapy [5]. In depressive disorder with psychotic features this (often in combination with pharmacotherapy) seems to be the most supported strategy [5];
- Successful pharmacotherapeutic approaches have also been published, mostly with antidepressants, antipsychotics or a combination of both [5];
- Bipolar disorder should be considered in patients under the age of 25 years [15];
- Special measures may be needed due to an important risk of suicide [8].

### Future perspective

Although Cotard's syndrome is a phenomenological diagnosis, not fitting in our current classification system, in our opinion, Cotard's syndrome can be a phenomenological expression

of several disorders, including somatic, neurologic and psychiatric disorders. The phenomenological similarity between these cases suggests that a common psychopathological pathway causes these delusions to be formed. Research on syndromes where isolated delusions are manifested, such as in Cotard's syndrome, could provide more knowledge about pathophysiological/neuropsychological mechanisms in these and other disorders manifesting with delusional symptoms. For this reason, study of phenomenology remains important in the future to gain a better understanding of brain functioning.

### Financial & competing interests disclosure

*The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.*

*No writing assistance was utilized in the production of this manuscript.*

### References

Papers of special note have been highlighted as:

- of interest
  - ■ of considerable interest
- 1 Cotard J. Du délire hypochondriaque dans une forme grave de la mélancholie anxieuse. *Ann. Med. Psychol.* 4, 168–174 (1880).
  - **First article (case series), describing Cotard's syndrome as a separate diagnostic entity. Core symptoms are defined and the association of the syndrome with depression is put forward.**
  - 2 Cotard J. Du délire des négations. *Arch. Neurol.* 4, 282–428 (1882).
  - 3 Séglas J. Mélancholie anxieuse avec délire des négations. *Progr. Med.* 46, 417–419 (1887).
  - 4 Régis E. Notre historique et clinique sur le délire de négations. *Gaz. Med. (Paris)* 2, 61–64 (1893).
  - 5 Debruyne H, Portzky M, Peremans K, Audenaert K. Cotard's syndrome. *Mind Brain J. Psychiatry* 2(1), 67–72 (2011).
  - **Most recent review on Cotard's syndrome.**
  - 6 Berrios GE, Luque R. Cotard's syndrome: analysis of 100 cases. *Acta. Psychiatr. Scand.* 91, 185–188 (1995).
  - 7 *Diagnostic and Statistical Manual of Mental Disorders (4th Edition, Text Revision).* American Psychiatric Association, WA, USA, 413 (2000).
  - 8 Enoch D, Trethowan W. Cotard's syndrome. In: *Uncommon Psychiatric Syndromes (3rd Edition)*. Butterworth and Heinemann, Oxford, UK, 162–183 (1991).
  - 9 Hansen ES, Bolwig TG. Cotard syndrome: an important manifestation of melancholia. *Nord J. Psychiatry* 36, 218–223 (1995).
  - 10 Yamada K, Katsuragi S, Fujii I. A case study of Cotard's syndrome: stages and diagnosis. *Acta Psychiatr. Scand.* 100, 396–399 (1990).
  - 11 Duggal HS, Jagadheesan K, Haque Nizami S. Biological basis and staging of Cotard's syndrome. *Eur. Psychiatry* 17, 109–109 (2002).
  - 12 Chiu HF. Cotard's syndrome in psychogeriatric patients in Hong Kong. *Gen. Hosp. Psychiatry* 17, 54–55 (1995).
  - 13 Ramirez-Bermudez J, Aguilar-Venegas LC, Crail-Melendez D, Espinola-Nadurille M, Nente F, Mendes MF. Cotard syndrome in neurological and psychiatric patients. *J. Neuropsychiatry Clin. Neurosci.* 22, 409–416 (2010).
  - 14 Edlestyn NM, Oyebo F. A review of the phenomenology and cognitive neuropsychological origins of the Cotard delusion. *Neurol. Psychiatr. Br.* 13, 9–14 (2006).
  - 15 Consoli A, Soutanian C, Tanhuy M *et al.* Cotard's syndrome in adolescents and young adults is associated with an increased risk of bipolar disorder. *Bipol. Disorders* 9, 665–668 (2007).
  - **Reviews Cotard's syndrome in young adults and its association with the development of bipolar disorder. Presents important prognostic data and therapeutic consequences.**
  - 16 Mendez M, Ramirez-Bermudez J. Cotard syndrome in semantic dementia. *Psychosomatics* 52, 571–574 (2011).
  - 17 Freudenreich O, Basgoz N, Fernandez-Robles C, Larvie M, Misdraji J. Case 5–2012: a 39-year old man with a recent diagnosis of HIV infection and acute psychosis. *N. Engl. J. Med.* 399, 648–657 (2012).
  - 18 Kudlur SNC, George S, Jaimon M. An overview of the neurological correlates of Cotard syndrome. *Eur. J. Psychiatr.* 21, 99–116 (2007).
  - ■ **Extensive review of clinical data from published case reports. An overview of clinical findings in Cotard's syndrome is presented in a comprehensive table, giving the reader more insight into the symptoms sometimes described as typical for Cotard's syndrome.**

- 19 Alheid A. Considerazioni sull' esperienza nichilistica e sulla syndrome die Cotard nelle psicosi organiche e sintomatiche. *Il Lavoro Neuropsichiatrico* 43, 927–945 (1968).
- 20 Young AW, Leafhead KM. Betwixt life and death: case studies of Cotard delusion. In: *Method in Madness: Case Studies in Cognitive Neuropsychiatry*. Taylor & Francis, Hove, UK, 147–171 (1996).
- 21 Ellis HD, Young AW, Quayle AH, de Pauw KW. Reduced automatic responses to faces in Capgras delusion. *Proc. Biol. Sci.* 264, 1085–1092 (1997).
- 22 Hirstein W, Ramachandran VS. Capgras syndrome: a novel probe for understanding the neutral representation of the identity and familiarity of persons. *Proc. Biol. Sci.* 264, 437–444 (1997).
- 23 Breen N, Caine D, Coltheart M. The role of affect and reasoning in a patient with a delusion of misidentification. *Cogn. Neuropsychiatry* 7, 113–137 (2002).
- 24 Gerrans P. Refining the explanation of Cotard's delusion. *Mind Lang.* 15, 111–122 (2000).
- 25 McKay R, Cipolotti L. Attributional style in a case of Cotard delusion. *Conscious Cogn.* 16, 349–359 (2007).
- 26 Coltheart M. Cognitive neuropsychiatry and delusional belief. *Q. J. Exp. Psychol. (Hove)* 60, 1041–1062 (2007).
- 27 Coltheart M. The neuropsychology of delusions. *Ann. NY Acad. Sci.* 1191, 16–26 (2010).
- ■ **Profound explanation of the two-factor model is given and related to neuropsychological research and neuroimaging in delusional patients.**
- 28 Young G. Beliefs, experiences and misplaced being: an interactionist account of delusional misidentification. *Phenom. Cogn. Sci.* 10, 195–215 (2011).
- ■ **Not only explains the interactionist model for delusional misidentification, but also the whole theory is explained in its relation to other models, which are briefly reviewed.**
- 29 Corlett PR, Aitken MR, Dickinson A *et al.* Prediction error during retrospective evaluation of causal associations in humans: fMRI evidence in favor of an associative model of learning. *Neuron* 44, 877–888 (2004).
- 30 Fletcher PC, Anderson JM, Shanks DR *et al.* Responses of human frontal cortex to surprising events are predicted by formal associative learning theory. *Nat. Neurosci.* 10, 1043–1048 (2001).
- 31 Turner DC, Aitken MR, Shanks DR *et al.* The role of the lateral frontal cortex in causal associative learning: exploring pre-ventative and super-learning. *Cereb. Cortex* 14, 872–880 (2004).
- 32 Ratcliffe M. *Feelings of Being: Phenomenology, Psychiatry and the Sense of Reality*. Oxford University Press, Oxford, UK (2008).
- 33 Leafhead KM, Young AW, Szulecka TK. Delusions demand attention. *Cogn. Neuropsychiatry* 1, 5–15 (1996).
- **One of the few research articles in the neuropsychological field where a patient with Cotard's syndrome is tested. Using an emotional stroop paradigm, an attentional bias was found in a patient with Cotard's syndrome.**